AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING

TABLISHED
8 8 0

EBRUARY
1937

THE AIR CONDITIONING SECTION

Page 35

BUILD MORE SALES VOLUME WITH BERLOY STEEL JACKETS FOR HEATING AND AIR-CONDITIONING UNITS

Coal Boiler Jacket

● You *must* join the parade of modernity, to *meet* the *public demand* for beautifully jacketed heating and air-conditioning units! Be a leader—establish yourself at the head of the industry *now*, and cash in on this sensationally growing market!

Increased utility and arresting beauty can be built into jackets for boilers, oil burners, stokers, air-conditioning units, etc., through the capabilities of Berloy engineering service. Berger offers in one organization a group of expert designers and metal-working specialists, supported by outstanding facilities for the manufacture of sheet products of every description.

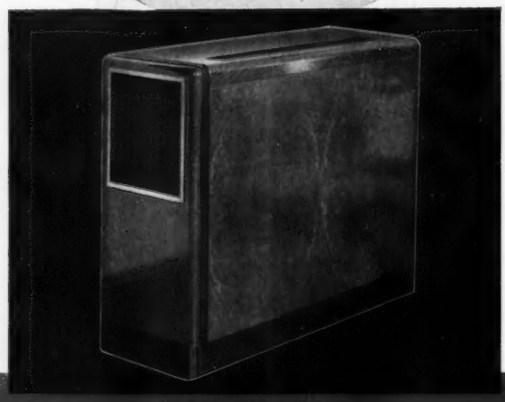
We can definitely help you create a greater demand for your products.

Consult Berger now, we will immediately place a Berloy engineer at your service.

REPUBLIC STEEL

BERLOY

REPUBLIC STEEL



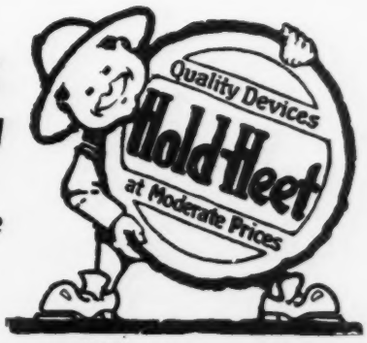
Air-Conditioning Cabinet

THE BERGER MANUFACTURING COMPANY • CANTON, OHIO

Division of Republic Steel Corporation

ALL *from this* 1 UNIT

with controls and any warm air furnace



HOLD-HEET B1F

Illustration shows unit assembled, complete as shipped, with noiseless 23″ Planoidal Blower, direct-connected to 100-speed, ⅙ H. P. 8-pole, Ballentine Capacitor Motor, over-size Filter installation that allows splendid gravity circulation, and new Jet and Target Humidifier. The unit is completely coated with sound-deadening material on all panels.

Complete Winter Air Conditioning

1. Automatic Temperature Control
2. Automatic Supply and Control of Humidity
3. Forced Air Circulation
4. Air Filtering ... *and* ...
5. **Summer Cooling** *for the entire house—with filtering*

THIS ONE UNIT has ample capacity to provide complete winter air conditioning for a large furnace heated home. The same unit has cooling capacity for a moderate home—using University of Illinois Night Fan Cooling Principle. Only Hold-Heet offers these compelling sales advantages at reasonable cost. Here is air conditioning that every home owner can afford. Here is your greatest opportunity for multiplied sales and profits.

ANY FURNACE MAN can sell and install this unit, for it comes fully assembled, ready to connect up to the cold air return line. Its large reserve capacity is instantly available at a turn of the 100-speed control to adjust to seasonal requirements or from winter to summer operation. It will work with any make of furnace—with oil, gas, or coal heat. It will even serve poorly engineered duct work. The unit can be sold complete, installed for $200 with a full profit to the dealer. The price would run around $250 when a regulator set is also required.

HERE is air conditioning for the average home—Hold-Heet Air Conditioning that the average home owner can afford, Air Conditioning that thousands of homes are ready to buy. Here is an opportunity for unlimited sales and profits. It's all set up, ready to start . . . All the data, the Sales Literature, the Installation Manual will be sent FREE upon request. Just mail in the coupon, mail out the circulars and close up the prospects with the illustrated Hold-Heet sales portfolio.

Don't delay — send in the Coupon Now.

RUSSELL ELECTRIC CO., *Mfrs.*
342 West Huron Street, Chicago, U. S. A.

Free!

Russell Electric Co., Mfrs.
342 W. Huron Street
Chicago, Illinois

☐ Send Free Manual No. 936 on Sales, Service and Installation with all sales Helps.

☐ Send Dealer Price List (Only Supplied When Your Letterhead Shows You Are a Regular Heating Dealer).

Name .....
Street Address .....
City ..... State.....
Name of Individual.....
Name of Preferred Jobber.....

In This Issue

Contact with readers during the last six months and correspondence, indicates a surprising lack of information on the requirements of contractors under the Social Security law. Two state conventions recently attended tend further to emphasize that far too many contractors are not acquainted with the things to be done in 1937. We offer some suggestions on page 19.

*

Further along this same line we asked Joseph G. Dingle to prepare a brief summary of what contractors must do in Social Security to avoid complications for 1936 and future requirements. His summary of procedure is on page 24. If you have lost necessary compliance procedure in the mass of information published, you can find your requirements in this article.

*

This issue contains reports of two state conventions (Wisconsin, page 32 and Indiana, page 83.) Several of the addresses are highlighted because of the interesting data presented. To our way of thinking the conventions this year have been more than ordinarily informative, as portrayed by the reports from our notes.

*

"You Tell 'Em—but When and How," is the title of the second article on selling by R. L. Towne. In January, the author explained how to canvass and prepare a prospect record file. This article takes the prospect information and explains how to build a special pictorial presentation which sells by **showing** and telling. The visual sales manual suggested is 1937 merchandising. See page 47.

*

Last fall a house with 244,000 Btu loss was completed in Ohio. We visited the installation and found several ideas of interest. A description of the design and features of interest appears on page 50. The installation is a case example of the jobs of 1937.

*

The series on design of duct systems by S. Konzo has pointed out that there are several adequate methods for sizing ducts. The article in this issue explains how to size ducts to equal friction and clearly points out the good and bad points of this method. For those using this method without thinking about other methods and for those who have never used this method, the article is recommended.

*

Last year three articles were published by R. D. Madison on the frictional resistance of small elbows. We asked Mr. Madison to summarize his recommendations for practical use. The result is the article on page 58 which supplies several charts showing how to reduce elbow friction. A decided addition to practical engineering data.

AMERICAN ARTISAN

With which is merged

FURNACES and SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor — Brewster S. Beach, Consulting Editor

Vol. 106, No. 2 — February, 1937 — Founded 1880

CONTENTS

Social Security and Money in Your Pocket	19
Metropolitan Museum's New Metal Roof	20
A Window Display	23
New Duties for Employers	24
Ohio's 1937 Convention	27
Skylight Construction (Raising Sash)	28
Pattern for a Range Canopy	30
Fabricating Procedure for Stainless Clad Steel	31
The 1937 Wisconsin Convention	32
The 1937 Indiana Convention	83
New Products	86
New Literature	79
With the Manufacturers	96
News Items	100

THE AIR CONDITIONING SECTION

You Tell 'Em—But When and How	47
Air Conditioning a House with 244,000 Btu Loss	50
Konzo-Design of Duct System to Equal Friction	54
Chart Method for Locating Splitters in Elbows	58
Humidity in House Heating	60
New Specifications for Fuel Oil	62
Michigan State College Short Course	78

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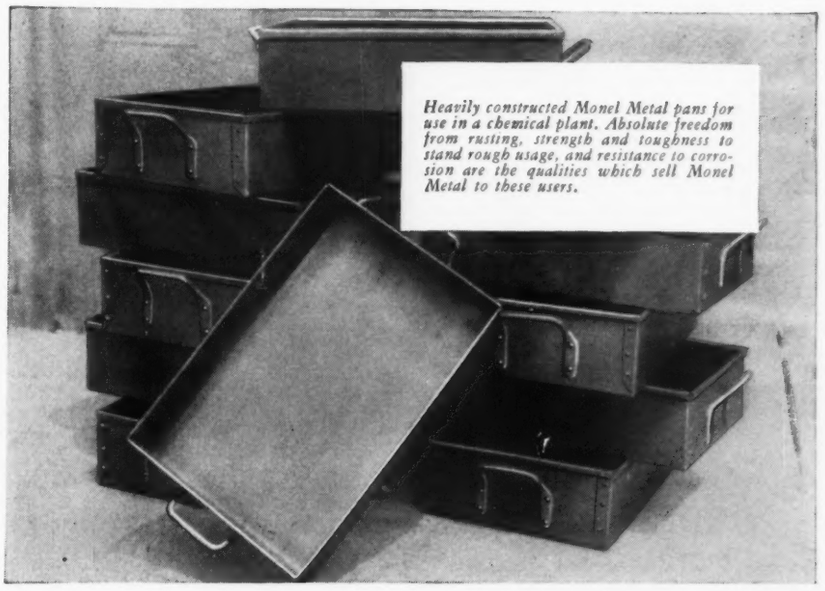
More than 8,000 Copies of this Issue are being distributed

Tips on Trays



Heavily constructed Monel Metal pans for use in a chemical plant. Absolute freedom from rusting, strength and toughness to stand rough usage, and resistance to corrosion are the qualities which sell Monel Metal to these users.

No profits in being a "waiter". . . Go out and tell your customers you make trays of Monel Metal!

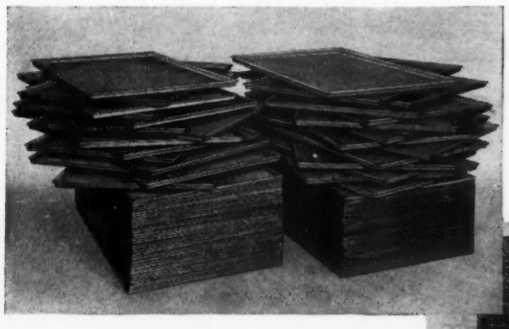
THOUSANDS of trays like the ones on this page were made and sold last year. Thousands more will be sold this year. Are you getting *your* share of the business?

It's easy business. And it's profitable business. Every merchant who handles or processes food needs trays. Bakers use them. Makers of chemicals use them. As you can see, even schools use them. These men may not know the trays they need should be Monel Metal until *you* tell them. But they'll see it soon enough when you do.

What *they* want is a tray that does not rust. That resists corrosion and cannot taint any foodstuff or other product it touches. That has the strength and toughness to stand up under rough and careless treatment. All that means they need trays of Monel Metal.

What *you* want is orders. Orders for material which can be easily worked . . . for jobs which give you an honest profit. And orders which commonly demand a large number from each customer. Monel Metal trays fit that picture too.

Fabricated Monel Metal trays used for the handling of sausage casings. These trays are readily made of Monel Metal in sizes especially suited to the packer's requirements.



(Above) Monel Metal rectangular shallow trays suitable for drying, cooling, displaying, handling and general processing of foodstuffs and related products such as edible dyestuffs and flavoring extracts. (Right) 1000 Monel Metal window flower box pans fabricated by a Minneapolis artisan for use in the public schools of Minneapolis, Minn.

Go around a few blocks in your city. Spread the word among packers, food wholesalers, laboratories and chemical plants that you can make the trays they need. It won't take you long to pick up some healthy orders. And soon after, some sizable profits from those orders.

For complete prices on Monel Metal Sheet, and full instructions for working, write *to-day* to:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

Monel Metal

for

UTMOST CONVENIENCE

•

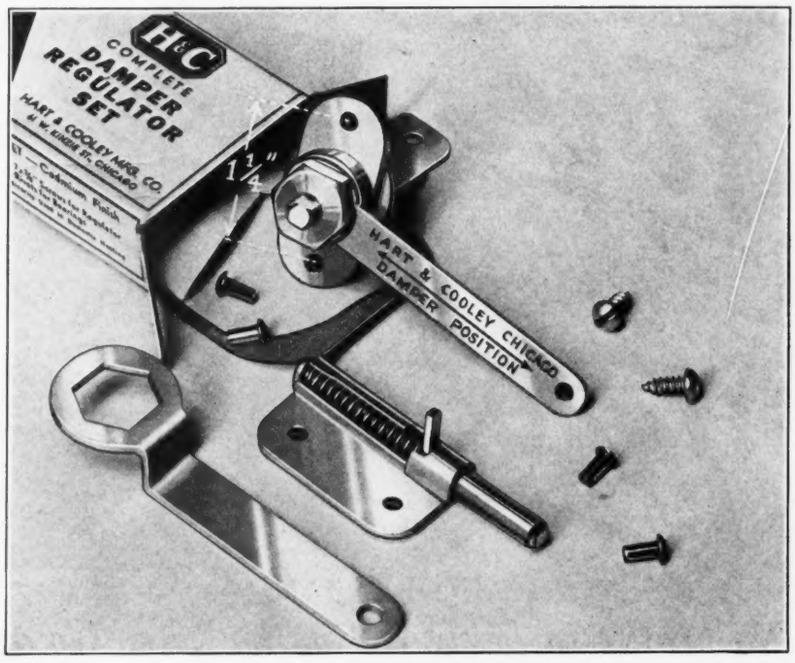
NEAT, SECURE INSTALLATIONS

•

DEPENDABILITY

Use

H&C



Class No. of ¼ inch Complete set is No. 50¼.
Class No. of ⅜ inch Complete set is No. 50⅜.
(No. 50¼ Set illustrated; No. 50⅜ described below.)

DAMPER REGULATOR SETS

¼" SNAP END BEARING

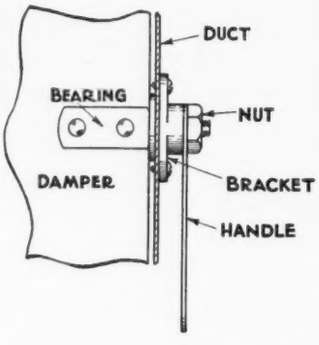
A REAL CONVENIENCE

No. 53¼ Snap Bearing is regularly furnished with No. 50¼ Set and is also available separately. The bearing consists of a pin sliding in a sleeve with a spring to force the pin outward. When the damper is being installed, the pin recedes into the sleeve until it is opposite the hole in the duct, when it snaps into the hole. A quarter-turn fastens the pin in place: a decided advantage since even the smallest dampers can be installed without bending.

Solid End Bearing (instead of Snap Bearing) is furnished with No. 50⅜ Set. All bearings are made of steel and are equally adaptable to both splitter and regular dampers.

Wrench for tightening nut is furnished with each package of 12 No. 50¼ Sets—6 No. 50⅜ Sets.

YOUR JOBBER HAS THEM



Damper is held securely against both turning and end play, thus eliminating all vibration.

Handle may be removed after adjustment of damper, if desired, preventing tampering with damper.

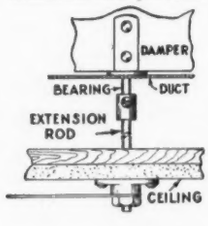
Handle rotates in complete circle, permitting installation of regulator in any position. Handle always indicates position of damper.

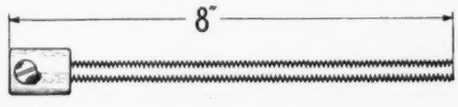
Compact design of bracket permits installation near edge of duct and on either round or flat duct.

Bearings, handle, screws, and nuts are Cadmium-plated and bracket is die-cast, thus preventing rust.

FOR INACCESSIBLE PLACES

H & C Nos. 55¼ and 55⅜ Extension Rods (8" long) make it possible to adjust dampers when ducts are located in inaccessible places—behind ceilings, in walls, etc. One Extension Rod provides sufficient extension in most cases. If extension longer than 8" is required, two or more rods may be coupled together. By setting flat side of extension rod in line with flat side of bearing, the handle indicates position of damper the same as if no extension rod were used. Cadmium finish. No. 55¼ packed 12 to carton; No. 55⅜, 6 to carton.



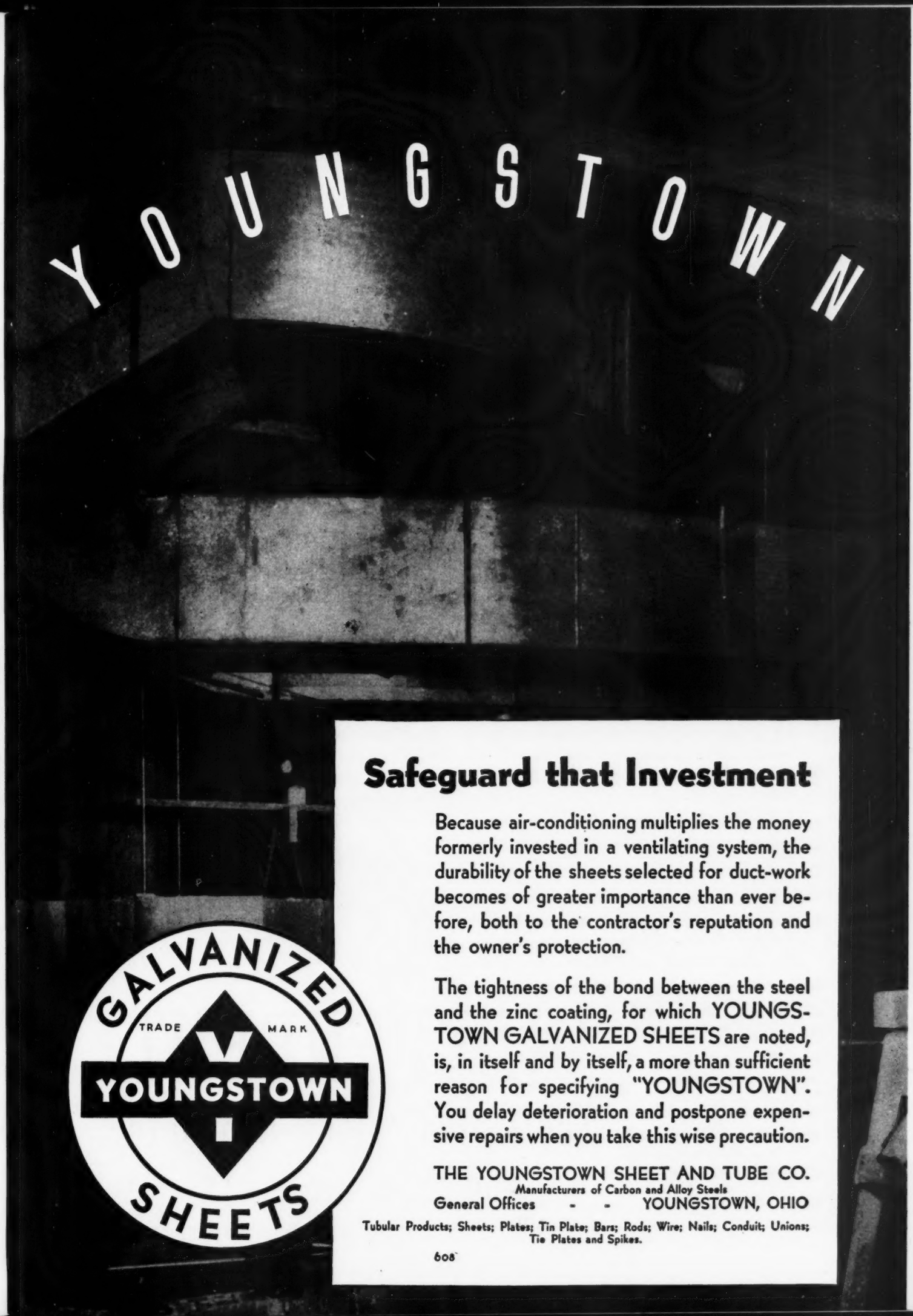


HART & COOLEY MANUFACTURING CO.

Warm Air Registers · Air Conditioning Grilles
Regulator Sets · Dampers · Chain

61 W. KINZIE ST. · CHICAGO · ILLINOIS

In Canada: Fort Erie N., Ontario



Safeguard that Investment

Because air-conditioning multiplies the money formerly invested in a ventilating system, the durability of the sheets selected for duct-work becomes of greater importance than ever before, both to the contractor's reputation and the owner's protection.

The tightness of the bond between the steel and the zinc coating, for which YOUNGSTOWN GALVANIZED SHEETS are noted, is, in itself and by itself, a more than sufficient reason for specifying "YOUNGSTOWN". You delay deterioration and postpone expensive repairs when you take this wise precaution.

THE YOUNGSTOWN SHEET AND TUBE CO.
Manufacturers of Carbon and Alloy Steels
General Offices - - YOUNGSTOWN, OHIO

Tubular Products; Sheets; Plates; Tin Plate; Bars; Rods; Wire; Nails; Conduit; Unions; Tie Plates and Spikes.

Photo: N. B. Aukerman

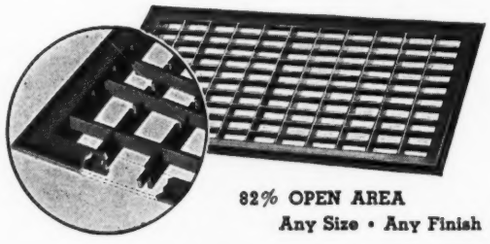
Qualities which Cannot be Duplicated

THE buyer of rugs travels to the far corners of the earth to secure fine texture with color and craftsmanship — qualities available only in genuine Oriental rugs.

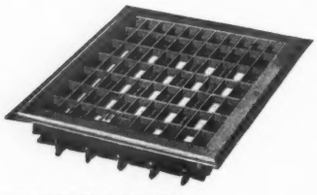
The heating engineer need not travel far for the best in floor registers and cold air faces. He knows that only the original Independent "Fabrikated" has *all* the qualities that bring enduring satisfaction to every job he installs. He knows that maximum strength and rigidity, modern design, beautiful finishes and the utmost in free air area, are *all* combined in Independent "Fabrikated" Registers and Cold Air Faces.

Send for catalog

THE INDEPENDENT REGISTER CO.
3741 EAST 93rd STREET CLEVELAND, OHIO



82% OPEN AREA
Any Size • Any Finish



STANDARD MESH

CLOSE MESH

INDEPENDENT

"Fabrikated" Floor Registers
(REG. U. S. PAT. OFF.)
and Cold Air Faces

AND AIR CONDITIONING REGISTERS AND GRILLES

SUNBEAM

PRICES REDUCED!

Most building material prices are advancing. Manufacturing costs are rising. Every trend in the industry is Up, Up, Up.

YET SUNBEAM REDUCES PRICES and offers its distributors and dealers the greatest opportunity they have ever had to get a greater share of the rapidly increasing Air Conditioning and Furnace business.

Take immediate action! How long these new prices will prevail no one can tell. Take this first step NOW—use the coupon.

SUNBEAM AIR CONDITIONING SCHOOLS

Sunbeam distributors in many sections of the country will be conducting Air Conditioning Engineering Schools in conjunction with The Fox Furnace Company. Enterprising furnace dealers who wish to become air conditioning specialists will find that these schools are most instructive and practical and that they offer an opportunity for future profits. Write for schedule of the schools in the section of the country where you are located.

THE FOX FURNACE COMPANY
ELYRIA, OHIO
Division of American Radiator & Standard Sanitary Corporation

The Fox Furnace Co.,
Elyria, Ohio

Please send me literature on your complete line of SUNBEAM Furnaces and Air Conditioning Units . . . also the name of your nearest jobber.

Name.....

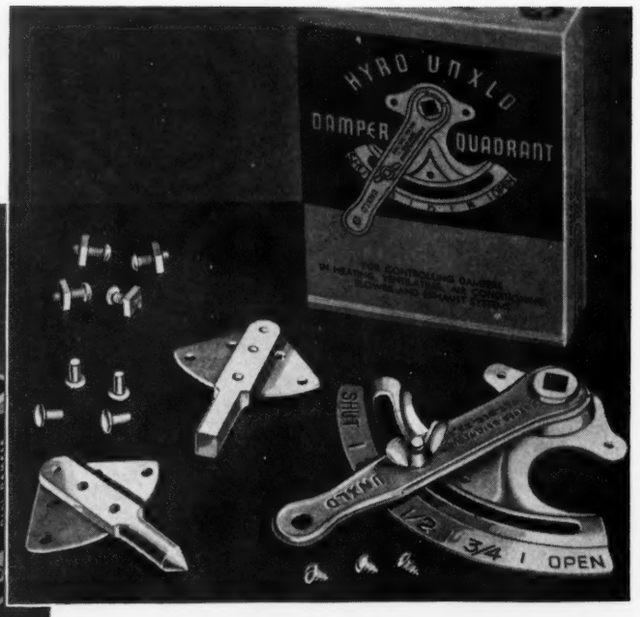
Address.....

City.....State.....

AA-2-37

Here's your answer-

WHETHER YOU WANT THE BEST...



...OR EFFICIENCY AT LOW COST

Try these and you'll agree there's no finer Damper Control than the famous UNXLD Damper Quadrant . . . and none that affords such high efficiency for little money as the Improved Parker-Kalon Dial Damper Regulator.

For the damper control job that requires the finest available manually operated device you can't go wrong in using the UNXLD Damper Quadrant which for many years has been considered the "standard" for quality and efficiency. Try it and you'll know why.

When you seek an inexpensive control that is absolutely reliable and highly efficient, you'll find the perfect answer in the Improved Parker-Kalon Dial Damper Regulator. See the new features of this famous device in the small pictures shown at the right.

Both of these Parker-Kalon Controls come in handy complete set boxes. And both sets include the superior new Universal Bearings which are adjustable for either regular or splitter dampers, and are much stronger and easier to install. All necessary Sheet Metal Screws and rivets are also included. Write us or ask your supply house for the Folder which gives all the facts and sizes.

PARKER-KALON CORPORATION, 190 Varick St., New York

PREVENTS AIR LEAKAGE
This cross section shows how the unique, one-piece frame construction seals the opening in the duct to prevent leakage of air . . . promoting efficient operation of the system.
NEATER — STRONGER
SUITED TO ALL DUCT SHAPES
The one piece heavy gauge steel frame is extra strong. The shape permits installation in any required position on either rectangular or round ducts. Markings on face of frame are large and clearly defined to show position of damper at a glance.
OPEN
SHUT
EASILY OPERATED
Free and easy operation of the Regulator is assured by the flanged construction of the lever which rotates upon the hub of the frame. Another feature is the extruded lever opening which provides ample contact for Bearing or rod, eliminating damper rattle.

Products of
PARKER-KALON CORPORATION

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

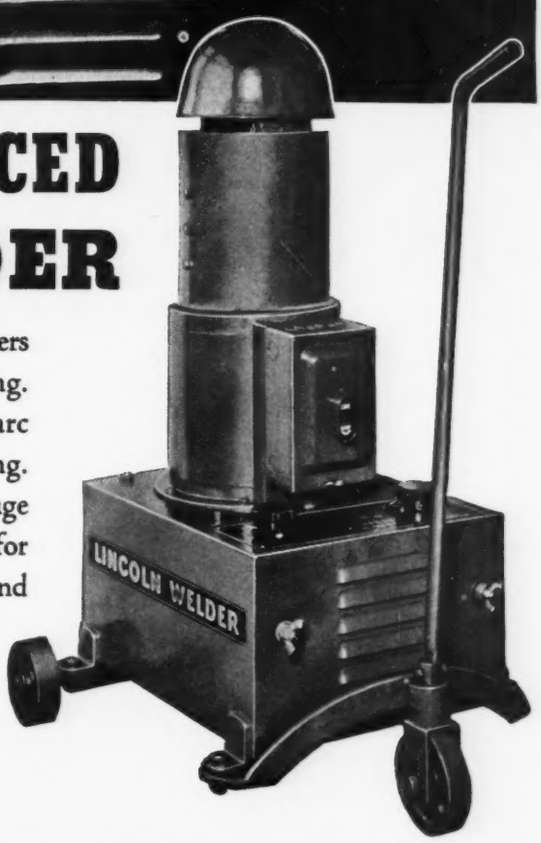
with this new LOW-PRICED LINCOLN WELDER

All you do is connect one of these new Lincoln Welders to your power line, push the switch and start welding. And you get RESULTS! Its speedy, concentrated arc confines the heat and eliminates buckling and warping. It is always handy—ready to weld anything from 24-gauge sheet up to angle iron and plate sections. No delays for materials. No rent for welding material containers. And the cost of welding is far less than ever before, its electric power costing as little as 5 cents an hour.

Equipped with one of these high-grade welders, you can branch out into new lines of metal fabrication. Some shops are even doing industrial maintenance work on the side, realizing a substantial income from this business alone.

You can own one of these Lincoln Welders for as little as $200, and you can arrange for payment on easy terms. Investigate this profitable machine today! THE LINCOLN ELECTRIC COMPANY, Dept. EE-336, Cleveland, Ohio. *Largest Manufacturers of Arc Welding Equipment in the World.*

***Mail this coupon* TODAY**



THE LINCOLN ELECTRIC CO., Dept. EE-336, Cleveland, O.

Gentlemen: Please send me full particulars on the new $200 Lincoln Welder. I now weld with electric arc ☐ gas ☐.

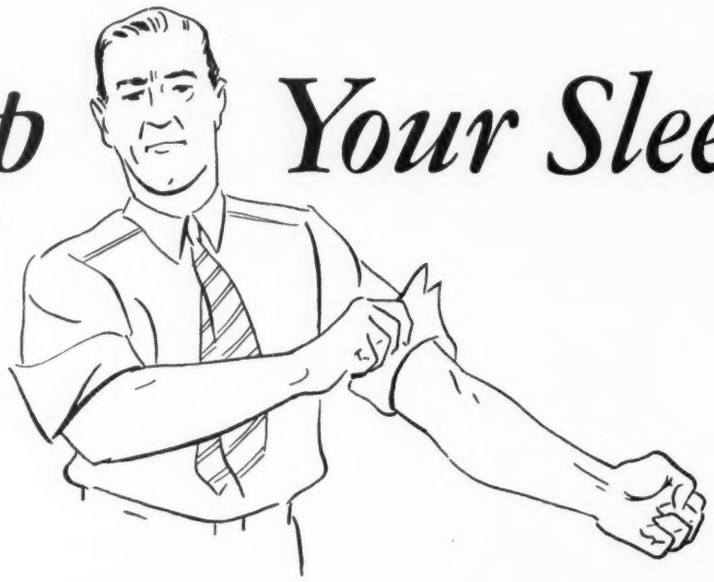
Name _____

Firm Name _____ Title _____

Address _____

City _____ State _____

Roll Up Your Sleeves



THERE'S WORK TO BE DONE —AND MONEY TO BE MADE

DURING 1937 it is predicted 425,000 new homes will be built in the United States. That means 425,000 new heating or air conditioning jobs.

Add to this an unestimated number of replacements and change-overs to air conditioning, which everyone grants will be the greatest the industry has ever known, and you have promise of the greatest year in history.

Yes, sir, there's work to be done, and money to be made—lots of it.

But, will you get your share?

You will if you are ready to work and have what it takes . . .

. . . And Moncrief gives you what it takes to profit most from your work.

- A complete line of furnaces, air conditioning units and air conditioning appliances, modern and quality-made, to fit any need and any pocketbook.
- Construction which makes installations easy, quick and profitable.
- Everything in pipe, fittings and accessories for both gravity and air conditioning installations.
- A reputation of 40 years building heating equipment.
- An Engineering Service to help you figure and install jobs properly.
- Effective literature and sales promotion material to multiply your selling efforts.
- A Special Finance Plan which makes it easy to close sales.
- Trade practices which recognize that our dealers must prosper as well as we.

. . . *and here's a hint for 1937*—"Watch Moncrief."

THE HENRY FURNACE & FDRY. CO.
3473 EAST 49th STREET • CLEVELAND, OHIO

MONCRIEF *Furnaces and Air Conditioning Systems*

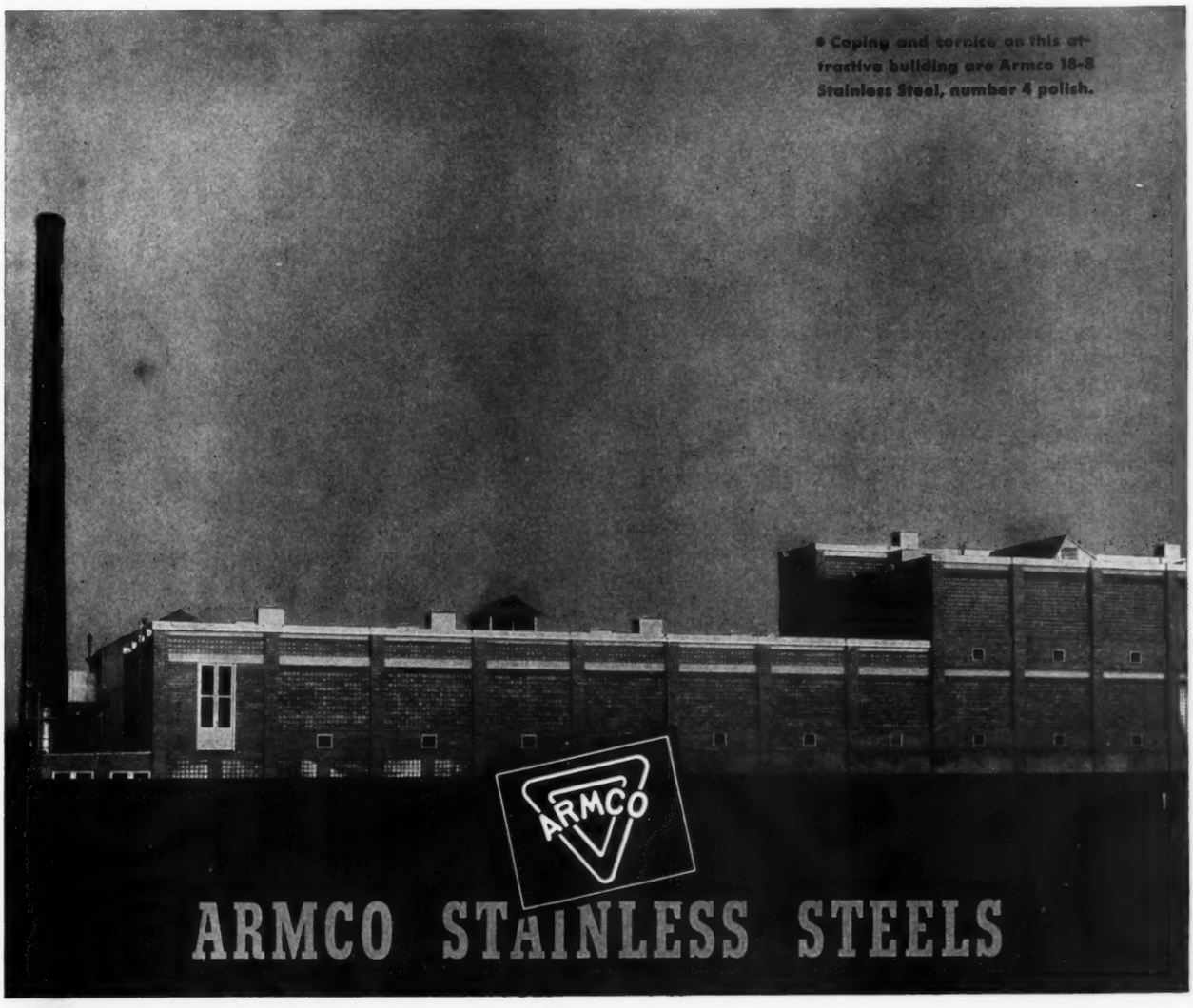
THE SKYLINE OF TODAY

DURABLE AND SHINING ALWAYS

Stainless Steel is well known among builders for its use on the world's tallest skyscrapers. Now industry is following architecture by building for the future with Armco Stainless Steel. In the hands of skilled contractors it is rapidly becoming useful for the protection and decoration of valuable industrial properties.

Both you and your customer can place every confidence in Armco Stainless Steel. It forms easily and quickly, can be soldered or welded, and once installed maintenance problems are at an end. The beautiful lustre of its surface finish is unaffected by atmospheric corrosion. It does not tarnish or discolor. Year after year Armco stainless will provide the utmost protection and with occasional washing remain bright and shining. This means customer satisfaction and confidence and a lasting tribute to your handiwork. Use Armco stainless for cornices, copings and other building detail. There is a right grade of Armco stainless for the right purpose. Six different finishes ranging from white pickled to high-lustre polish give you ample selection for every possible specification. What's more you can depend on quick delivery of Armco stainless from the nearest Armco Distributor. Consult with him on difficult working problems or write direct to us. The American Rolling Mill Co., Executive Offices, 703 Curtis St., Middletown, Ohio.

Listen to the Armco Band, the Ironmaster and a dramatic sketch Tuesday nights on the NBC Blue Network at 10 E. S. T.


• Coping and cornice on this attractive building are Armco 18-8 Stainless Steel, number 4 polish.
ARMCO
ARMCO STAINLESS STEELS

Harold P. Mueller (center) drops in on a couple of welders.

THE SECRET OF A GOOD NAME

IT TAKES a lifetime to build a good reputation, yet it can be lost in one deliberate misdeed. My father drilled that precept into me from the time I was a little shaver in knee pants.

"Whether the name applies to a man or a manufacturer matters little," he said. "The trade and the public are quick to discern true quality in either. Build a good name — and guard it well!"

I've never forgotten that. Father made the name of this company a *good* name wherever heating equipment is known, and I've made it my job to carry on. Our customers can sell Mueller equipment with confidence, and build an enduring volume of customer good-will.

So, if sometimes you think we're a little fussy about details here at the Mueller plant, you can lay the blame right on my doorstep—and I'll like it! For I'm not going to let anything go out of this shop that might reflect on the good name my father built, and that I'm trying to maintain.

Frankly, I think our present line of heating and air conditioning equipment more than upholds our reputation for well-styled products of quality. In appearance and performance it meets modern demands.

Mueller Coal Fired furnaces and boilers and the Gas Era line still enjoy an enviable reputation for quality. They are the kind of products of which you can be proud.

Write today for Mueller catalog. AA-2.

L. J. MUELLER FURNACE CO.
Milwaukee, Wis.

H. J. Mueller

MUELLER-MILWAUKEE

SERIES TWENTY AIR CONDITIONING OIL FURNACE

The Series Twenty is a recent Mueller achievement scoring triumphs wherever people want a compact, efficient automatic heating and air conditioning unit at a price the "little fellow" can afford. This unit supplies completely automatic heat plus filtered, humidified and circulated air. The Series Twenty is supplied without oil burner. Practically any gun type burner may be used.

Casing is finished in velvet green crinkle lacquer with black and chromium trim. Be sure to get acquainted with this unit. It can make real money for you.

A 1490 Mile Wind!

WHEN you install Cheney Flashing, you can be sure that your customer is getting the fullest protection that a through-wall flashing can give. You know that it will assure proper drainage . . . provide a really dependable key bond in all directions, both lateral and vertical . . . and permit all necessary expansion and contraction. So efficient is this bond that tests have shown it would require the tremendous pressure of a 1490 mile wind to break the bond between Cheney Flashing and a 6-inch coping stone laid over it. Cheney Flashing is justly recognized as the last word in high-grade through-wall flashing. It is a typical example of Revere standards of quality in all the products it makes or sells. For information and specifications on Cheney Flashing, or any other product described on this page, write our Executive Offices, 230 Park Avenue, New York City.

REVERE SHEET COPPER

Easily worked. Popular for roofing, flashing, gutters, downspouts, skylights, cornices, etc. Comes in hard and soft tempers and in a variety of finishes for all requirements.

REVERE LEADTEX

Sheet copper lead-coated by a special Revere process that assures uniform thickness and tenacious adhesion of the lead. Combines the easy workability and light weight of copper with the non-staining and decorative qualities of lead.

REVERE THRU-WALL FLASHING

An excellent through-wall flashing at a moderate price. Bonds in all lateral directions. Comes in flat sheets. Easily cut and formed to fit requirements, with your regular shop equipment.

Revere Copper *and* Brass

FOUNDED BY PAUL REVERE

1801

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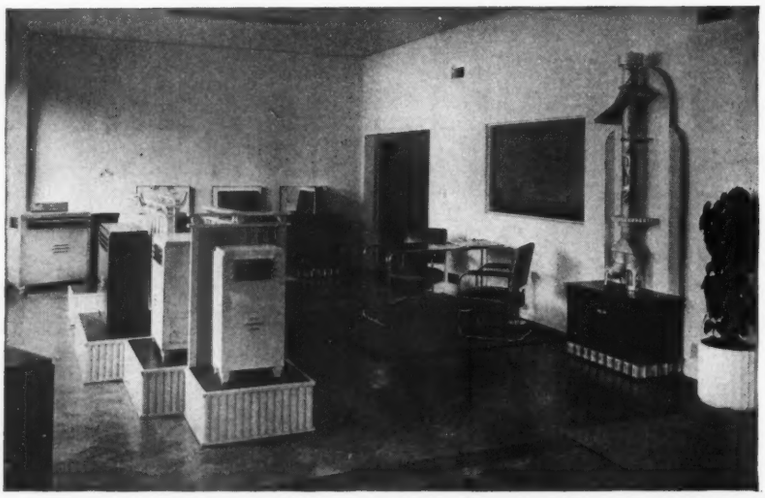
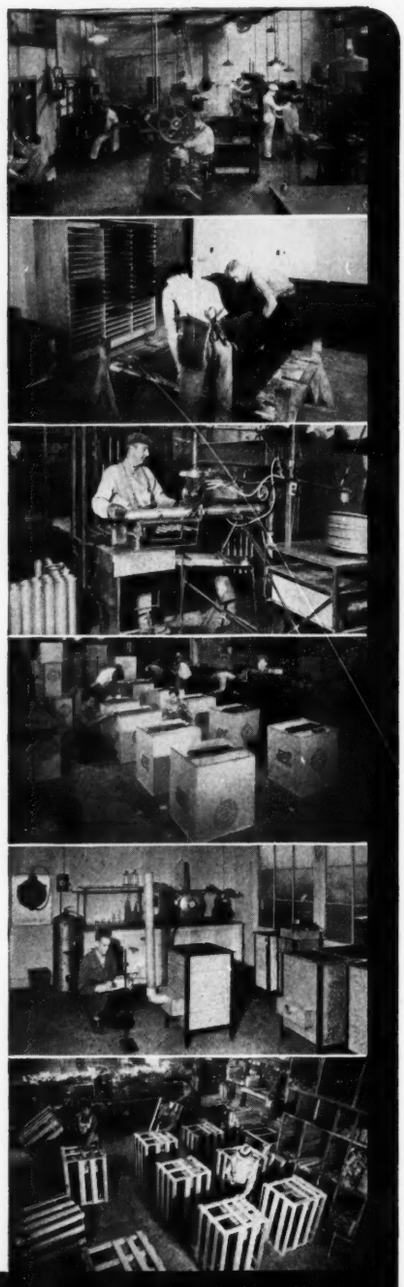
EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS. NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

There's No Mystery about PAYNE QUALITY



Convincing evidence of the facilities for producing better gas appliances is shown below in the views of the various departments in the Payne plant.



It's Built-in by Modern Methods in a Complete Plant Designed for Gas Appliance Manufacture

★ The processes of manufacture form the background for successful gas appliance merchandising. Payne products run the gamut in modern manufacturing methods, and the satisfaction and good will they have produced prove their superiority.

High grade metals are used throughout in the production of Payne appliances. All heating elements of Payne furnaces are completely welded, to prevent leakage of burned gases into the rooms being heated.

Burners and all machined parts are made by precision machinery under the hands of expert mechanics.

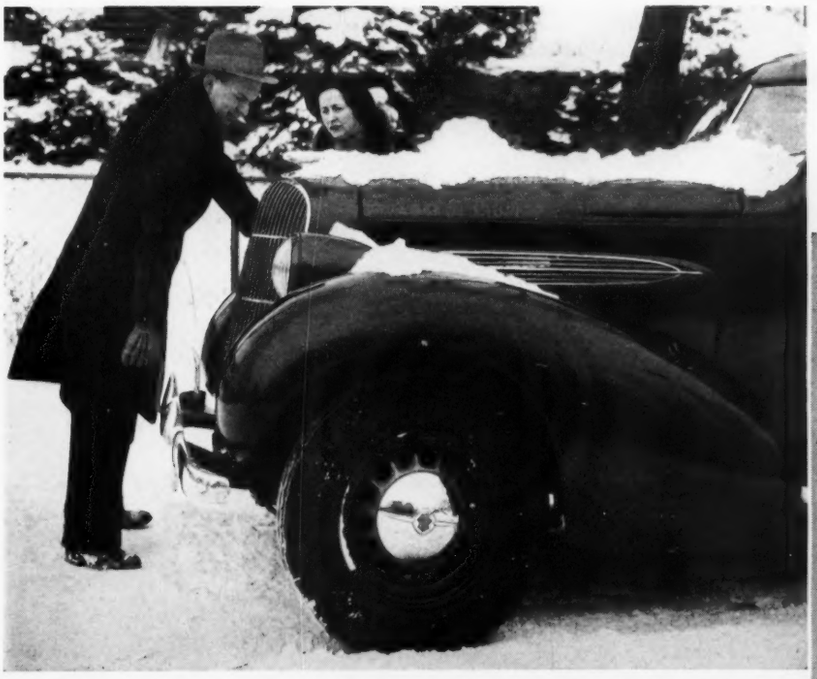
The most up-to-date equipment is used for graining, enameling and baking the various finished models of Payne appliances.

An appliance is not permitted to leave the Payne factory without first being thoroughly tested in our own laboratory, complete in every detail to carry on this work. In addition to this, Payne appliances are tested and approved by the American Gas Association Laboratory.

Twenty years of merchandising experience has shown us many of the "angles" and better methods for displaying and selling gas appliances. These methods are tried out in our own sales organization and in our own community. We are, therefore, able to cooperate fully with commercial departments of gas companies to help them formulate and carry out successful campaigns for heating appliance sales and increased heating load.

When planning your 1937 heating campaign write us for any assistance desired. Our organization and facilities are yours to command.

PAYNE FURNACE & SUPPLY COMPANY
BEVERLY HILLS · CALIFORNIA



EWING GALLOWAY PHOTO

A Slow Start . . . makes the Going Harder

Let your car's battery run down about now and it means trouble the first cold day. If you allow your enthusiasm for business to get a little low, it may cost you a slow start in the spring. You know a lot of spring work is placed every winter.

For example, every weakness of a heating plant shows up at this time of the year and ways of correcting these faults can be explained better when the system is in operation. So can automatic controls and humidification. But, more important than the orders received are the contacts and friendships which can be made more easily now, when folks are at home.

One visit we wish you would make, whenever you can conveniently, is to stop in to see us. We, too, are preparing for spring and knowing our customers better, working closer with them, is both an important and pleasant part of our business.

ANACONDA
Copper

•

ARMCO
Ingot Iron
Stainless Steel

•

AUER REGISTERS

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BARRETT COMPANY
Products

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BLACK & DECKER
Tools

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F. DIECKMANN COMPANY
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Aluminum

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GOLDEN STAR
Sheets

•

HOLD-HEET
Furnace Controls

•

INDEPENDENT
Registers & Grilles

•

KEYSTONE
Copper Steel

•

MINNEAPOLIS-HONEYWELL
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MONCRIEF FURNACES

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Products

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PECORA ASBESTOS
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Galvannealed Sheets

A DEPENDABLE SOURCE OF SUPPLY FOR 79 YEARS

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO—CLEVELAND—DETROIT
Metals and Metal Products

He took headache pills for typhoid fever
Sad? Yes—but silly, too! There's little excuse for such fatalities in these days of medical science and education—and there's *no* excuse for premature and costly failures of pipe and sheet metal in these days of expert metallurgical knowledge. With Toncan Copper Molybdenum Iron available, the use of ordinary ferrous materials where corrosion is known to be a deciding factor is foolish economy.
REPUBLIC STEEL
TONCAN
COPPER MOLYBDENUM IRON
HIGHEST RUST-RESISTANCE IN ITS PRICE CLASS
Toncan Iron is available through distributors in pipe and sheets and may be had in bars, plates, roofing, siding, boiler tubes, welding rod and other forms. For ordinary service these products may be had in steel or copper-bearing steel. Write for details.
Republic Steel Corporation
GENERAL OFFICES . . . CLEVELAND, OHIO

● Through leading trade publications Republic is telling to cost-minded men in industry the story of the futility of using inadequate materials where corrosion is a deciding factor in determining the life of ferrous materials.

Help your customers fight corrosion by using Toncan Iron—it will maintain good-will and build profits.

When writing Republic Steel Corporation for further information please address Department AA

AMERICAN ARTISAN

Volume 106 Number 2

Social Security

CONVENTIONS recently attended and local meetings visited in the past few months, forcibly emphasize the fact that too many employers are much too ignorant for their own good of the requirements of the Social Security Act. In some instances it has seemed as though these employers do not even realize that they have certain obligations which they must meet.

The Social Security Act has had wider publicity than almost any other law enacted within memory. Publications of all kinds have devoted pages and pages to the requirements of the law. At the same time speakers have been going up and down the land for more than a year explaining, illustrating,, answering questions—yet—

We come to January, 1937 and are astonished to find that many employers do not know that they have taxes to collect, reports to file, bookkeeping systems to overhaul, plus numerous problems of shop management effected by this new law.

These brief suggestions are offered:

Every employer who has one mechanic in his employ comes under this law. If you employ less than eight you pay a tax for old age benefits and your mechanic pays an equal tax. If you employ eight or more mechanics you and your employees pay the old age benefits tax and in addition you as the employer pay a tax for unemployment insurance. In some states your mechanics also pay a tax into this fund.

You should understand that old age benefits taxes are reported, collected and mailed every month beginning with January, 1937 to the Collector of Internal Revenue for your district. If you employ eight or more your tax for unemployment compensation is due now and you have until April 1, 1937 to pay at least one-quarter of your tax *on your payroll for* 1936. If your state has an accepted unemployment law you pay 90 per cent of your tax to the state and 10 per cent to the Federal government.

There are several provisions you must keep in mind and follow. The necessary procedure is not complicated, but it *must be followed.*

If you have done nothing to date we suggest that you get a copy of the act for study from your nearest Social Security Office (there is one in most large cities already), write for form 940 (on which you report for unemployment compensation and form SS1 (on which you report for old age benefits). You should have received form SS1 already—if not you have been overlooked and should apply to be registered. You will receive form 940 within a short time (if not already) unless you employ less than eight in which case you need do nothing except keep your books.

More complete information on procedure is contained in an article in this issue. If you've done nothing to date we recommend you read the article carefully.

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Money in Your Pocket

IT'S hard to find a contractor who did not make more money in 1936 than he made in any recent year. Many contractors made so much money that they showed a profit. An equally imposing list did a tremendous volume of business—but they didn't show a profit.

Those who did not make a profit have a thousand excuses to offer. Perhaps some of these answers are too good to be called excuses and should be called "reasons." It may be possible that some of these "reasons" are actually "reasonable."

But there is this fact which no man can deny—if you did not make a profit there is a good reason why.

Perhaps you lost the profit because prices in your community are ruinously low. Perhaps it was because you underestimated the labor cost on too many jobs—or the material cost. Perhaps it was because your costs of doing business are so high you can't charge them off or so high that jobs go to your competitors.

Perhaps a hundred perhapses—but the chances are you did not make a profit because you did not know just how much it was costing you to do business. In other words "overhead." Sometimes it seems as though "overhead" has been dinned into business men's heads so loudly and so long that just plain curiosity should compel a man to see what "overhead" is all about.

But they never get around to investigating.

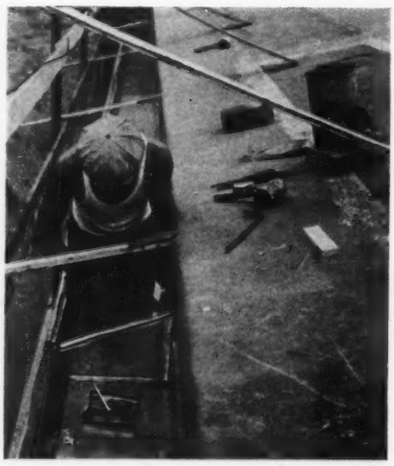
1937 seems likely to be one of the best years our part of the construction industry has enjoyed in many years. 1938 and 1939 can be as good or better. If, therefore, you want money in your pocket NOW is the time to make those profits. If you don't make profits on the rising business wave, the chances are you will need your old age benefits.

Installing part of the 110,000 pounds of Monel metal, laid standing seam, on the Metropolitan's roof. The mechanic below is nailing top cleats on a sheet. Some interesting reasons were advanced by Metropolitan's engineers for standing seam rather than batten. (See text.)

The Metropolitan Museum's (N. Y.) New Metal Roof

SHEET metal contractor J. J. Fisher Co., Brooklyn, N. Y., is completing at this time its contract to furnish and apply some 40,000 sq. ft. of new standing seam roofing on the Metropolitan Museum of Fine Arts, New York City, as the institution's first action in renovating all of its six acres of roof area. The old roofing, of batten-type and laid in 1900, had pitted, eroded and fractured so badly that leakage began to endanger many of the famous collections of textiles, tapestries, armor, rugs and other irreplaceable articles.

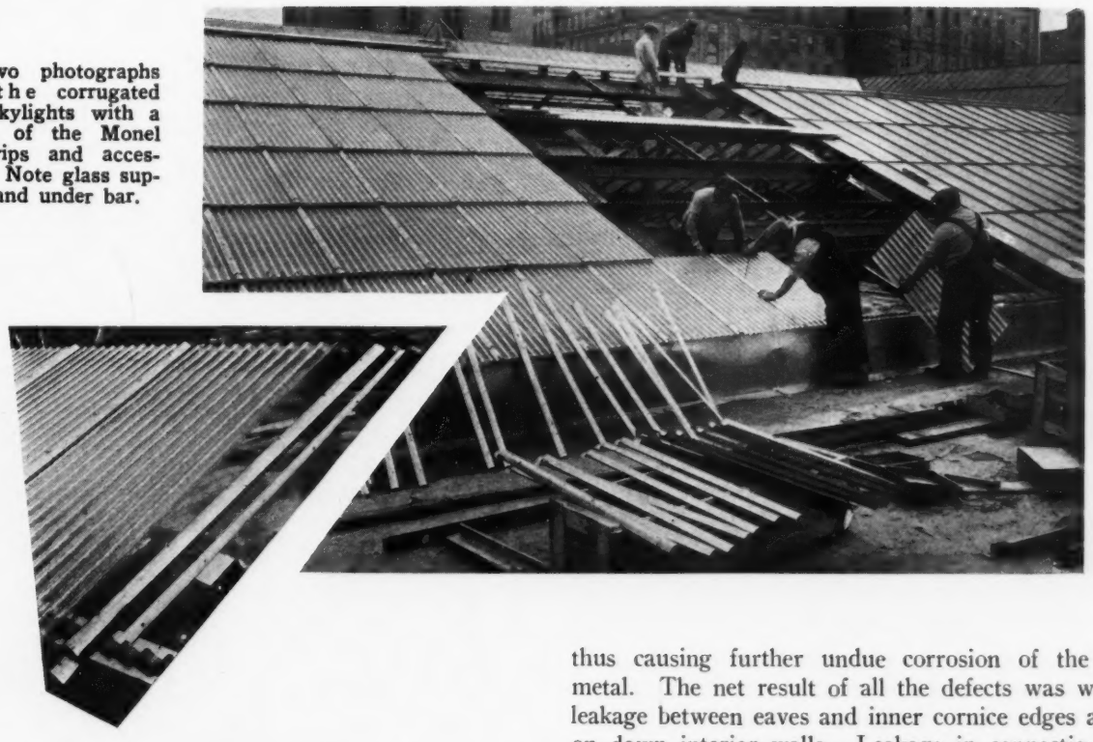
In addition to the new Monel Metal roofing, the contractor also constructed and applied some 2,500 ft. of box gutters of the same metal, conductors, skylights, frames and siding, flashing and other minor divisions of the complete remodeling. The battens formerly used were discarded inasmuch as only standing seam construction was specified for the new work. The Museum people, in fact, held that the particular batten method of application used on the old roof prevented adequate expansion and contraction of the sheet metal thus causing fracture. Cleavage occurred, however, not at battens, as might be anticipated, but between battens. The old battens were true rectangular, not trapezoidal in cross section, which shape is favored by many sheet metal men who like the batten method.



Soldering in the expansion joints in one of the box gutters.

It will be recalled that the new roofing of the New York City Public Library, described in an earlier issue, involved use of trapezoidal battens whose wider side was applied uppermost. In the library the original method—assumed to be corrected with the new metal and application method—involved attachment of the battens with their narrower sides on top. Superintendent A. Hewitt, of the Metropolitan Museum of Fine Arts, asserts that sufficient creepage tolerance is available with standing seams, minus battens, and that the omission of battens makes for a roof of more attractive appearance.

Failure of the old roof, whose skylights were of flat wired glass, was felt to be due to at least three major causes: first, erosion, due to sulphurous city smoke; second, electrolysis; third, fracture, due to lack of metal movement tolerance. Examination of the old roof, having a tinned surface, reveals serious pitting and erosion damage extending through the metal in many instances. This was held by Wm.



The two photographs show the corrugated glass skylights with a closeup of the Monel cap strips and accessories. Note glass support and under bar.

Chapman, assistant superintendent of the Museum, to be due to chemicals usually found in large-city air and to electrolysis caused by deposit of steel dust in this air which, having been deposited on the roof, paved the way to electrolytic action of the two metals.

Skylight Strength

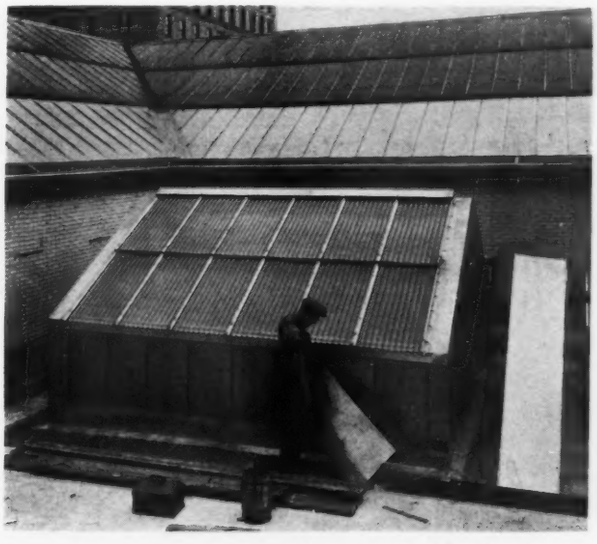
Trouble with the two skylights was two-fold. First, there was cracking of the glass, considered due to normal metal movement under varied atmosphere and, second, exhaustion by corrosion of steel bars, bolts and caps. Rusting of skylight frames released a considerable amount of rusty water with every rain. This drained over large roof areas beneath the skylights, thus causing further undue corrosion of the sheet metal. The net result of all the defects was weather leakage between eaves and inner cornice edges and so on down interior walls. Leakage in connection with certain skylights was so severe that heavy rains necessitated museum attaches placing pails to catch the drips.

Special Glass Features

As an important part of the roofing renovation here outlined some of the new skylights prove interesting in that they are, first, of a corrugated glass shape and, second, because they have no exposed cross bars. Whereas several new flat wired glass skylights were installed by J. J. Fisher & Co., the corrugated lights, consisting of about 20,000 sq. ft. were installed by Boorum & Co., Newark, N. J., skylight contractors.

This corrugated glass type of light which went onto the Museum's building is known as "H," the letter re-

Looking down the gutter on the Fifth Ave. side. The metal is carried from the cornice reglet across the gutter and up the monitor as flat locked and soldered single sheets. Standing seamed siding above.



View showing a typical section of inside hanging gutter, glass skylight, standing seam roofing, monitor siding and flashing at base of brick wall.

minding us that there are a total of 13 main buildings, wings and el's in the entire structure. The flat lights went onto building "D-W."

The corrugated lights have glass sections $\frac{5}{16}$ in. thick, 27 in. wide and 48 in. long. Tops and bottoms of glasses are lapped. Monel metal caps of special pattern cover the junction crevices between lights. Caps are bolted together and through and clips on under surfaces lock onto transverse steel channels that had been painted with asphaltum.

Skylight Troubles

On the "H" building four skylights each 20 ft. by 30 ft. and one large one, 78 ft. by 36 ft., now have the new corrugated lights. Roof ridge and eaves have, beneath the metal, white pine, special longitudinal pieces. Glass pieces rest on these wood strips and also on the steel channels, but the corrugations fit into special composition strips that insulate and protect against glass breakage due to shock. It is declared that so strong is the glass from the depression standpoint that 1 sq.ft. can support between 90 and 100 lb. avoirdupois. Yet, despite the thickness and strength of the glass, light transmission has not been sacrificed. If anything, it is enhanced, according to Assistant Superintendent Chapman of the Museum.

The four smaller skylights of the "H" roof do not rest on the roof directly but are built up 5 ft., monitor style, so that they appear from the roof to be penthouses. Siding on these is applied as standing seam.

Conductors from the box gutters already mentioned drain on to a flat cement roof, the latter being slightly pitched to numerous 6-in. interior drain pipes that pass the water to the sewer. Flashing between vertical roof surfaces and the roof involves the use of crimped metal superimposed on plain surfaces of the same metal, all metal pieces being soldered togethered. At the roof line the flashing has first a layer of tar paper, with cement on top.

Still another division of the Metropolitan Museum's new roofing of interest is the type and application of snow guards. The base of rail supports are of ¼-in. thick brass plate, being 10 by 14 in. Before being laid each plate was well buttered with Minwax Plastic Caulking Cement, then bases were bolted onto the roof at two points. Across and over the upper halves of all base plates were placed special metal flashing sheets. All edges then were soldered to roofing on three sides and onto the plates on the fourth side. Rails are ¾ in. brass pipes, joined together in sections by nipples of the same material.

Tracing the history of the Metropolitan Museum, the original building was erected in 1870. Since 1900, all the additions referred to have been made as growth of collections required. The present total roof area is placed at 6 acres, of which almost one-half is skylights. It is the intention of the Museum, partially supported by the City of New York, to lay new roofing over the entire area as funds and conditions permit. The present work includes coverage of some 1½ acres. Mr. Chapman, of the Museum, indicates that practically all their present roofing failures have occurred on roofing laid since 1900 and are due to poor application methods and poor workmanship.

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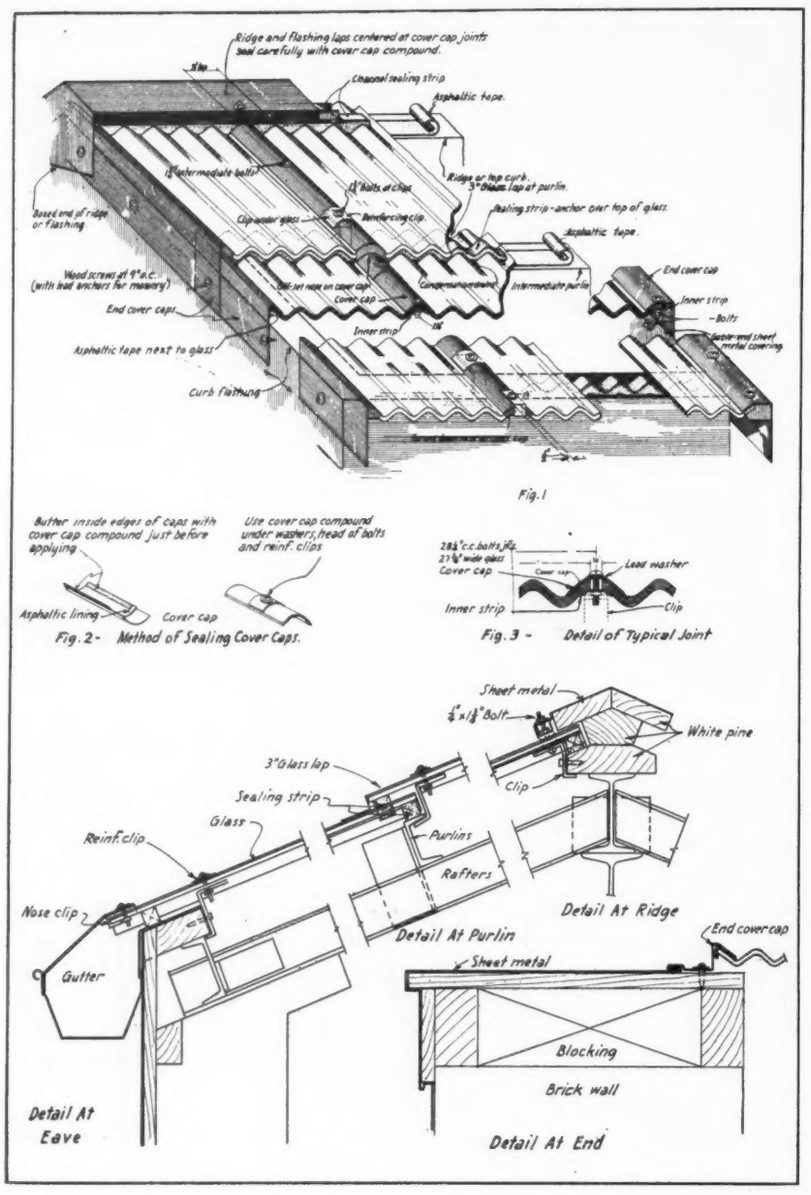


Group of details showing construction through one of the large glass lighted roofs which are almost too large to call a skylight. Note use of asphalt tape beneath glass in upper detail.

A Window Display

By Lawrence E. Gichner
Washington, D. C.

WHEN customers we hadn't heard from in years began calling us and telling how they liked our show window display, we realized we had discovered a little trick that not only we, but other members of our trade, might use.

Putting a piece of stove pipe and a section of gutter in a window may be a display, but it is never an attraction. Why? Because everyone has seen these objects hundreds of times. Spouts, ventilators, grilles and elbows are nothing novel.

When our local telephone company allowed us the use of their window on a busy thoroughfare we really began to plan a display. We found we had an awfully flat subject with which to work. As flat as the galvanized iron sheets with which we make our living. Our contemplated ideas and designs were awkward, stiff, lifeless.

At an art exhibition I recalled seeing a statue cut out and formed of brass of Cervante's ridiculously chivalrous knight-errant, Don Quixote. The interpretation was original, the work amusing, the whole effect pleasing. We traced the artist and for the price of transportation secured the loan of his creation.

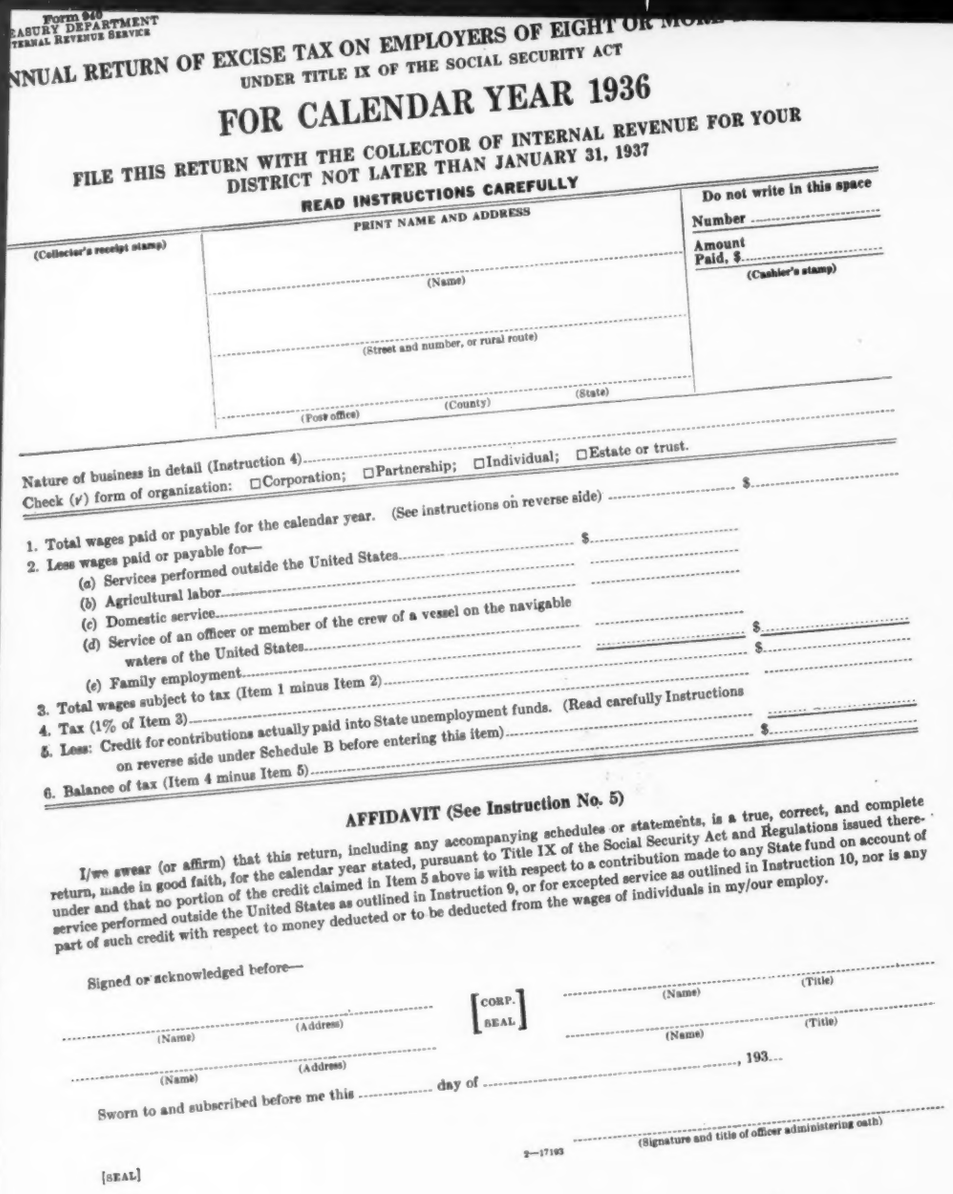
Quixote was the heart of our exhibit. He was the key of our discovery. He made folks stop. They were curious about this imperious figure on a gawky horse. He was silly with a pathetic silliness.

Once stopped, passers by gazed further. They read on two burnished copper scrolls the artifacts we make, the metal we form, the work we execute. For $12 we had made two large blow-ups of a picture from a manufacturer's circular showing metal work on a residence. These were tastily colored.

Quixote was the sugar of our pill, but the pill was made as attractive as possible with a chrome zinc reflecting sheet, green paper covered back panels, spouts erected horizontally to give a modern touch, model ventilators, and lightning rod equipment. We strove for taste. We had a lot of room for more things, but we did not want to crowd or over do.

We learned a good display is one of the best sales helps a merchant can employ. Windows are the most valuable part of a store, yet the dirty, sooty way many in the industry leave their windows cluttered up with trash, you would think it was the least important. It is a poor policy to erect circus and movie posters. They detract the attention from the display and suggest other ways of spending money.

Good window displays increase business. Successful stores spend big sums of money on their displays. An expert employed by a department store to direct only their window dressing, has a suite of offices and a dozen assistants, said recently, "People love to look in windows. Just walk along the street and you'll see how true that is. It is the most conspicuous part of a store."



FORM 940
TREASURY DEPARTMENT
INTERNAL REVENUE SERVICE

ANNUAL RETURN OF EXCISE TAX ON EMPLOYERS OF EIGHT OR MORE
UNDER TITLE IX OF THE SOCIAL SECURITY ACT

FOR CALENDAR YEAR 1936

FILE THIS RETURN WITH THE COLLECTOR OF INTERNAL REVENUE FOR YOUR DISTRICT NOT LATER THAN JANUARY 31, 1937

READ INSTRUCTIONS CAREFULLY

(Collector's receipt stamp)

PRINT NAME AND ADDRESS

(Name)

(Street and number, or rural route)

(Post office) (County) (State)

Do not write in this space

Number

Amount Paid, $

(Cashier's stamp)

Nature of business in detail (Instruction 4)

Check (✓) form of organization: ☐Corporation; ☐Partnership; ☐Individual; ☐Estate or trust.

1. Total wages paid or payable for the calendar year. (See instructions on reverse side) $
2. Less wages paid or payable for—
   (a) Services performed outside the United States $
   (b) Agricultural labor
   (c) Domestic service
   (d) Service of an officer or member of the crew of a vessel on the navigable waters of the United States
   (e) Family employment
3. Total wages subject to tax (Item 1 minus Item 2) $
4. Tax (1% of Item 3) $
5. Less: Credit for contributions actually paid into State unemployment funds. (Read carefully Instructions on reverse side under Schedule B before entering this item) $
6. Balance of tax (Item 4 minus Item 5) $

AFFIDAVIT (See Instruction No. 5)

I/we swear (or affirm) that this return, including any accompanying schedules or statements, is a true, correct, and complete return, made in good faith, for the calendar year stated, pursuant to Title IX of the Social Security Act and Regulations issued thereunder and that no portion of the credit claimed in Item 5 above is with respect to a contribution made to any State fund on account of service performed outside the United States as outlined in Instruction 9, or for excepted service as outlined in Instruction 10, nor is any part of such credit with respect to money deducted or to be deducted from the wages of individuals in my/our employ.

Signed or acknowledged before—

(Name) (Address) [CORP. SEAL] (Name) (Title)

(Name) (Address) (Name) (Title)

Sworn to and subscribed before me this day of , 193...

(Signature and title of officer administering oath)

[SEAL]

2—17193

New Duties for Employers

By Joseph G. Dingle
C. P. A., Ottawa, Ill.

WITH the New Year came several new and important duties for employers. Following is a general discussion of these new duties in order that readers may be prepared to perform in time and avoid the penalties which are imposed by the Federal Social Security Act. Notwithstanding all that has been published on this subject, there are many employers who do not yet seem to realize that there are two separate and distinct taxes imposed on employers. We shall attempt to discuss each of these taxes briefly because the first tax payment is due during the month of February.

Federal Unemployment Compensation Tax

TITLE IX, of the Federal Social Security Act, imposes a tax of 1% of total pay roll for 1936 on all employers of EIGHT OR MORE. Under the Act, this tax return and the payment of at least one-fourth of the tax became due on or before January 31, 1937. This date has been extended to April 1, 1937. This return is to be made on Form 940, which may be obtained from the Collector of Internal Revenue for your district, and when properly executed is to be filed with the Collector.

ARE YOU AN EMPLOYER OF EIGHT OR MORE? The Act (Sec. 907 (a)) defines an "employer" thus:

"The term 'employer' does not include any person unless on each of some twenty days during the taxable year, each day being in a different calendar week, the total number of individuals who were in his employ for some portion of the day (whether or not at the same moment of time) was eight or more."

After reading the above definition you may think you are not an "employer of eight or more," but it is up to you to know whether you had eight or more individuals in your employ on twenty different days during 1936. Of course, those who normally employ more than eight are subject to the tax, but those who employ six or seven regularly may find by examining their pay rolls for 1936 that they did have eight on some days.

Count these eight-man days carefully.

In preparing the return, it is first necessary to determine the total compensation paid to all employees. This total wages does not include compensation paid any individual in excess of $3,000 for the year. From this total wages paid or payable, there are certain allowable deductions, shown on the face of the return, as item 2. After deducting such allowable deductions, if any, from total wages there is, in some States a further credit allowable—up to 90% of the Federal tax shown as item 5. This credit is for contributions actually paid into State unemployment funds. If your State has an accepted Unemployment Compensation Act, you are required to fill out Schedule B of Form

PAY ROLL FOR PERIOD _____ 19__ TO _____ 19__ — PAGE_____

NAME	EMPLOYEE'S NO.			TIME		Rate per	EARNINGS			DEDUCTIONS				NET PAID		TAXABLE EARNINGS			
	Clock	Fed.	State	Days	Hrs.		Amount	Bonus Comm.	Total	Old Age Fed.	Old Age State	Unemployment Fed.	Unemployment State	Check No.	Amount	Old Age Fed.	Old Age State	Unemployment Fed.	Unemployment State
Amount brought forward.																			

Employees' ledger account on which a complete record of earnings, deductions and employer payments are itemized.

940, and from this schedule you determine the amount of credit to be used as item 5, on the face of the return.

It is required of all employers of eight or more that they fill out Schedule A, which is a simple one, particularly where the employer confines his activities to one state. It is required, in Schedule A, that the wages, subject to tax, be shown separately for each state, and that the number of employees subject to the Act in the pay period in 1936 ending nearest the 15th days of March, June, September and December, be shown.

Don't overlook the fact that officers of the corporation, salesmen, office help, and all others, who do not usually appear on the regular pay roll are to be counted as "employees subject to the tax." (See table in your copy of the Act for exemptions.)

The Federal tax, for 1936, is 1% of the pay roll. It is your privilege to pay this tax in quarterly payments. In those states which have accepted Unemployment Compensation Acts, there is a deductible credit against this Federal tax up to 90% of the amount due, provided the employer has paid taxes into the State Unemployment Fund. This tax is at 2% for 1937, and for 1938 and thereafter the rate is 3%.

To employers of six or seven individuals normally, we offer this suggestion: Watch your pay rolls in 1937 and avoid, if you do not want to be taxed, the employment of that eighth employee for the twentieth day. Group as much as possible the days of eight or more employees within one week and stay below eight as often as you can. Don't employ that eighth man for a day if you can avoid it. If you don't watch your pay roll and hoard those twenty days, you may find that by putting on an extra man for even an hour may subject you to a substantial tax—2% of your total pay roll for 1937.

Old Age Benefits Tax

We now take up TITLE VIII, of the Federal Social Security Act, which became operative January 1, 1937, on all wages or compensation paid for employment on or after January 1, 1937. This tax is on all employers in the business and professional world, employing one or more individuals. The employer must, during 1937, deduct 1% of the wages earned, paying only 99% to the employee. The deduction should be made from each wage payment, and during the month following the payment the employer must prepare Form SS-1 and send the return, and the tax shown to be due, to the Collector of Internal Revenue for your district. In addition to the duty of withholding the 1% from your employees' wages, you, as an employer are taxed a like percentage, to be paid at the same time as the withheld tax.

But this withholding and payment of the tax is only a part of your duty under the Act. First, you must obtain certain information concerning your employees. Heretofore, it was sufficient to know his name, and, for convenience, some employers registered the employee's

Form SS-1
TREASURY DEPARTMENT
INTERNAL REVENUE SERVICE

EMPLOYER'S RETURN UNDER TITLE VIII OF THE SOCIAL SECURITY ACT FOR THE MONTH OF _____, 193__

ORIGINAL RETURN
Read Instructions Carefully

1. Number of employees _____ 2. Taxable wages paid during month _____ $_____

Employers' tax (sec. 804)		Employees' tax (sec. 801)	
3. Tax (1% of item 2)	$_____	6. Tax (1% of item 2)	$_____
4. Credit or adjustment	$_____	7. Credit or adjustment	$_____
5. Total employers' tax	$_____	8. Total employees' tax	$_____

9. Total amount of taxes due (items 5 and 8) _____ $_____

Sworn to and subscribed before me this _____ day of _____, 193__

(Name) or (Witness) (See instructions, par. F) (Title) or (Witness)

Name

No. and Street

City and State

I swear (or affirm) that all entries made hereon, and contained in each schedule or statement attached and made a part hereof, are true and correct, and in accordance with the applicable law and regulations.

(Signed) _____

(Title)

This form must be filed in quadruplicate. The collector will return the quadruplicate copy as a receipt for taxes paid. 2—17215

NAME: LAST FIRST MIDDLE FED. ACCOUNT NO.

ADDRESS PAY ROLL NO.

BIRTHPLACE DATE OF BIRTH AGE MALE FEMALE

YEARS IN U. S. A. YEARS IN STATE YEARS IN COUNTY CITIZEN—NATURALIZED

TRADE OR OCCUPATION UNION AFFILIATION, IF ANY

Year	Federal O. A. B.	Federal U. C.	State U. C.

Date Paid	P/R Folio	PAY PERIOD From	To	Year	TIME Days	Hours	RATE	TOTAL EARNED	DEDUCTIONS Federal O. A. B.	Federal U. C.	State U. C.		NET PAID Check No.	Amount	TAXABLE EARNINGS Federal O. A. B.	Federal U. C.	State U. C.

Employee's record sheet on which yearly wages are entered by payroll periods. Employee history is included, also hours, days and pay periods with taxes deducted.

home address and, possibly, other data. Now, we must have the employee's full name, his Federal Account Number, his age, birthday, and, in order to be prepared to aid the employee in properly identifying himself at some future time, or to help protect him in obtaining his proper Old Age Benefits many years hence, it is well to record rather full information concerning each employee, even though he or she be a temporary employee.

Having thus registered the employees, we are now ready to take up the matter of keeping such a detailed record, FOR EACH EMPLOYEE, of the wages, and other compensation, paid, either in cash or other means, in order that at the required times the employer can furnish the Social Security Board, such information as is required on each employee. It is required that, in paying the employees, the employer must give the employee some record as to the amount of wages, and the tax deducted. If the wages be paid by check, it is suggested that there be shown on the check, either on its face or its back, data such as is illustrated in the following rubber stamp.

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If payments are in cash, it is suggested that some form of statement, embodying the information shown in the rubber stamp, and, if you wish, requiring the signature of the employee for the record of the employer. Of course, a copy of this statement should be given the employee for his record. Remember, you must be able to furnish the Revenue Agent proof of the proper payment of your pay roll taxes, and the law requires that you preserve your pay roll records for at least four years.

Now, we must make such a record for each employee as will meet future needs. For this we recommend the use of a pay roll sheet like the one here illustrated, to show for each pay period, the detailed information for each employee. Examination of this form discloses the employee's name, his clock, or factory pay roll number, his Federal and State numbers; then the number of days on which he performed work. Next appears the hours worked during the pay period. Here we want to stress the requirement as to days and hours. An employee may do some work on six different days, and yet his total hours of work may not be more than six. In such a case, he would have 6 days and 6 hours. Under general heading of Earnings, space has been provided for "Amount," "Bonus," or "Commission" and "Total." Next are several columns under the general heading of "Deductions." There are provisions for both Federal and State deductions for both Old Age and Unemployment. Of course, there is no tax deduction from the employee for Federal Unemployment Compensation, and there may be no State taxes for Old Age Benefits, but as this pay roll sheet was designed to fit almost any condition, the columns are there. Next is provided spaces to show Check No. and amount paid.

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In July, employers will be required to make such reports to the Social Security Board as will enable that board to post to each employee's account the data covering his earnings from January 1st to June 30th, and thereafter employers will make these information returns quarterly. Thus, from these ledger accounts for the employees, the employer will be able to compile the necessary data for these periodic information returns.

Then, too, if the Revenue Agent calls to examine your records to ascertain the correctness of your tax returns as filed, you will have adequate information for that purpose.

And this is not all. Should one of your employees die, you must report his death to the Social Security Board within 15 days. When an employee reaches age 65, you must, within 15 days, report that fact to the Social Security Board.

Thus, we say to you employers: Read this Social Security Act and get your house in order. If in doubt, don't hesitate to consult your Certified Public Accountant or your Attorney. This Act carries heavy penalties for its violation, and ignorance of the law excuses no one.

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M. A. Thesmacher, Chairman Entertainment.

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M. A. Thesmacher, Chairman Entertainment.

Skylight Construction

Showing the procedure in designing and fabricating raising sash for any type of skylight.

By William Neubecker*
Head Instructor,
Sheet Metal Department, New York Trade School

IN this fourth article to be presented on skylights we will show the construction features used in connection with raising sashes. Fig. 19 shows a perspective view wherein the full length of the sash is raised from curb to ridge. At the ridge, hoods are placed to prevent leakage at the pivot line, as indicated by *x-x-x*. At the curb-hinges, straps and arms are used to raise the sash, using the customary lifting worm and gear, partly shown by *a, a, a*.

The method of developing the pattern shapes for raising sashes will be omitted, as the principle is similar to that explained in connection with Flat Skylight published on page 19 April issue. The main feature is the constructive features. Finding the quantities of materials will also be omitted in this article.

Bar Construction

Carefully drawn construction details will be shown on the lines *A-B, C-D, E-F* and *G-H*. A detailed section on the line *A-B* is shown in Fig. 20. Note the high ridge which gives rigidity to sustain the weight of the raising sash. If desired, a core plate can be riveted between the two metal ridge walls. This ridge bar is formed in one piece with a lock at *C*. The common bar has the standard shape as shown at *D*. Note the formation of the curb *E*. It is bent in one piece with a double flange at *F* which hugs the inside of the wood or angle iron curb. A condensation tube is attached, cut off horizontally as shown, to prevent water from blowing inside. The ridge bar is capped as shown and is held in place with ⅛ in. brass bolts and nuts similar to *a* in the common bar, *D*. A detailed section on *C-D* in Fig. 19 is shown in Fig. 21 and is the standard half bar on the gable end of the skylight.

Detailed sections on the line *E-F* in Fig. 19 is shown in Fig. 22. Note the formation of the various bars and sash rails. Ridge section *E* is similar to ridge section in Fig. 20 and represents the section at *E* in Fig. 19. Section *F* in Fig. 22 is a section at the curb *F* in Fig. 19. Sections *H* and *G* in Fig. 22 are sections at *H* and *G* in Fig. 19. Section *H* in Fig. 22 shows a half bar and a sash bar interesecting at the ridge. Note the formation of the upper rail of the sash, from *J* to *L* which conforms to the shape of the main ridge; also the groove to receive the glass and the flange at *J* which forms a storm proof joint with the hood, which locks over the ridge bar at *U* and avoids soldering.

This hood has a hemmed, turned-in flange *V* and makes the tight joint *V-J* when the sash is closed; should any rain or snow blow in between the joint *J-V* it will flow out at the corner drips. The *dotted* section shows the position of the sash when the sash is open. A hard brass, $\frac{3}{16}$ in. rod, is soldered in the corner of the upper rail as shown, which acts as a pivot and keeps it from sliding out of the pivot holes punched in the double flange of the half bars as clearly indicated in section *H* and *G*. These pivot holes are reinforced by soldering washers on the straight side of the half bars as shown.

After the stationary lights are laid in putty the joint is capped by the half cap shown by *O* in each section *H* and *G* with a lock attachment which is pressed down firmly as shown and will require no bolts or soldering. The width of this lock is shown exaggerated to clearly show the construction in so small a drawing. After the stationary lights are glazed and capped as above described, the ridge capping shown in Fig. 20 is cut in sections to fit in between and over the half cappings *O* to *O* in Fig. 22 or the distance *J* in Fig. 19 on all stationary lights.

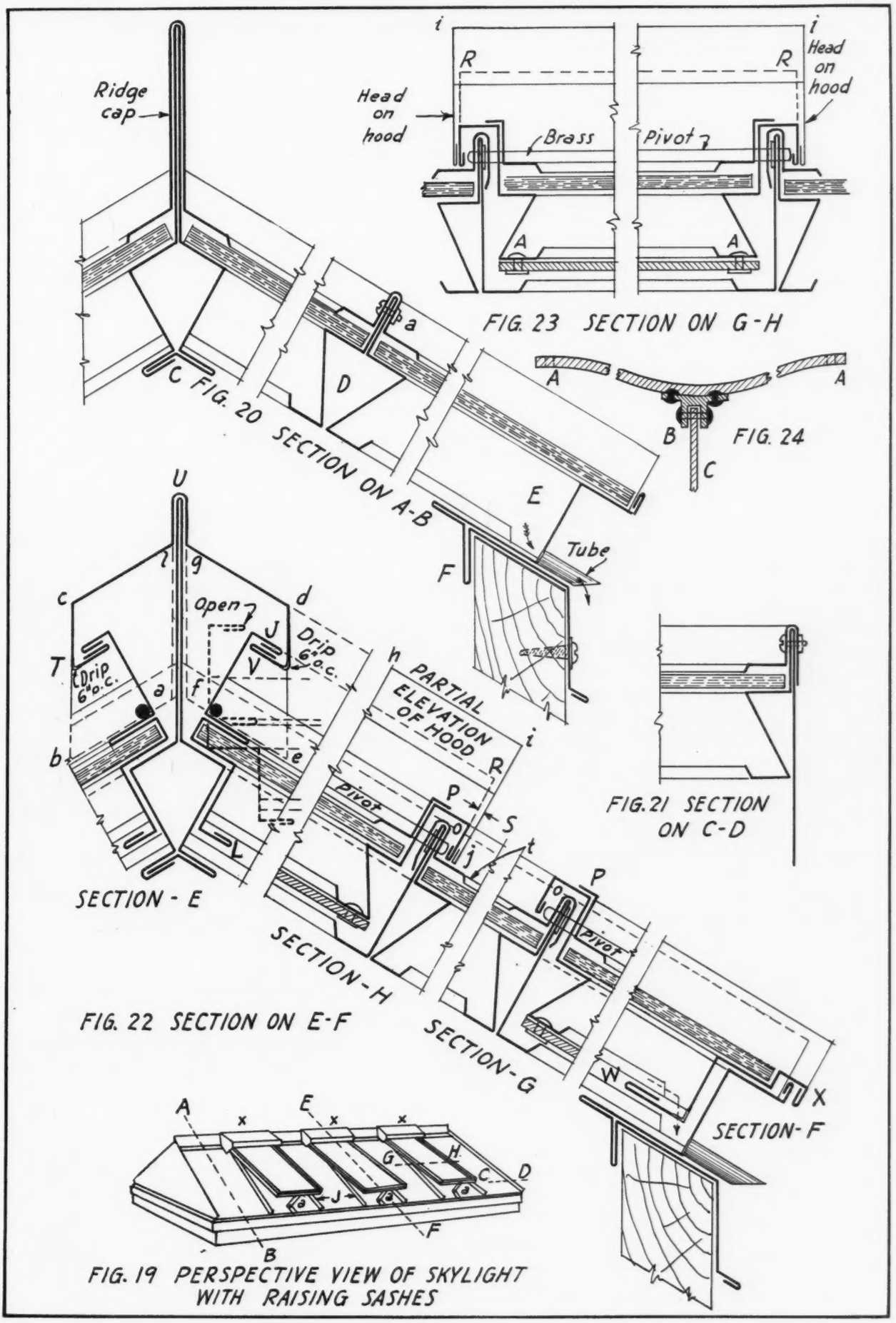
Rising Sash Bars

Now note the formation of the bars of the raising sash. They are formed inside of the half bar in both sections *H* and *G* and overlap the top of the half bar of the stationary light which makes a water-tight joint and can be raised or lowered as desired. These raising sashes are glazed in the usual manner and capped with a half capping which need only be tacked with solder at *P* and *P* in both sections.

Above the section *H* is shown a partial elevation of the hood. Note, as shown by the dotted line, that the upper part of the top rail of the sash at *J* extends on each side to meet the side rails of the lifting sash as indicated in section *H* at *R*. This forms a rigid construction and makes a tight joint at that point.

When the raising sash is in its proper position, the hood indicated by *T-U-V* is cut a scant ¼ in. longer

*All rights reserved.


Ridge cap
Head on hood
Brass
Pivot
Head on hood
FIG. 23 SECTION ON G-H
FIG. 20 SECTION ON A-B
FIG. 24
Tube
Open
Drip 6 o.c.
Drip 6 o.c.
PARTIAL ELEVATION OF HOOD
Pivot
FIG. 21 SECTION ON C-D
SECTION - E
SECTION-H
SECTION-G
SECTION-F
FIG. 22 SECTION ON E-F
FIG. 19 PERSPECTIVE VIEW OF SKYLIGHT WITH RAISING SASHES

than the width of the sash measured from *R* in section *H*, so that there is just enough play to allow easy movement when raising and lowering the sash, indicated by the space between the arrows *P* and *S*.

Heads are now soldered to the ends of the hood; the proper shape of the heads being shown at the ridge by *l a-b-c l* and *g-d-e-f-g*. This hood is set over the top rail of the sash as partly shown by *h-i-j* in the partial elevation and the lower edges of the heads as *b-a* and *f-e* are soldered tight to the half bar caps *o-o* along the bottom of the cap line *t*. Where the heads intersect the high ridge at *l a* and *g f* these joints are soldered water-tight. Section at *G* in Fig. 19 is shown by section *G* in Fig. 22 and is so placed to show its intersection with the skylight curb, section *F*. Note how the bar of the lifting sash miters with the curb of the lifting sash *W* to *X*, which in turn sits over the skylight curb and makes a tight overlap drip joint at *X*. Any condensation from the sash follows the arrow into the main curb gutter, thence to the outside through the tube.

A detailed section through *G-H* in Fig. 19 is shown in Fig. 23, which is a reproduction of similar bars shown in sections *H* and *G* in Fig. 22, but placed in Fig. 23 in their proper positions so as to show a true section through the raising sash, looking up toward the hood. *R-R* and *i-i* indicate similar positions *R* and *i* in section *H* in Fig. 22. When the sash is short in length, it is only necessary to rivet a flat band iron at *A* and *A* in Fig. 23 to which the hinge and strap are riveted. When a full length sash is to be raised, a band iron truss made of $\frac{3}{16}$ in. by 1 in. band steel as shown in Fig. 24, is riveted to *A-A* in Fig. 23 with hinge and strap riveted in center as shown by *b* and *c* in Fig. 24.

When fabricating skylights of this type, number 22-gauge, copper bearing galvanized iron should be used or 18 oz. cold rolled copper. No matter what metal is used, the labor is the same.

Pattern For a Range Canopy

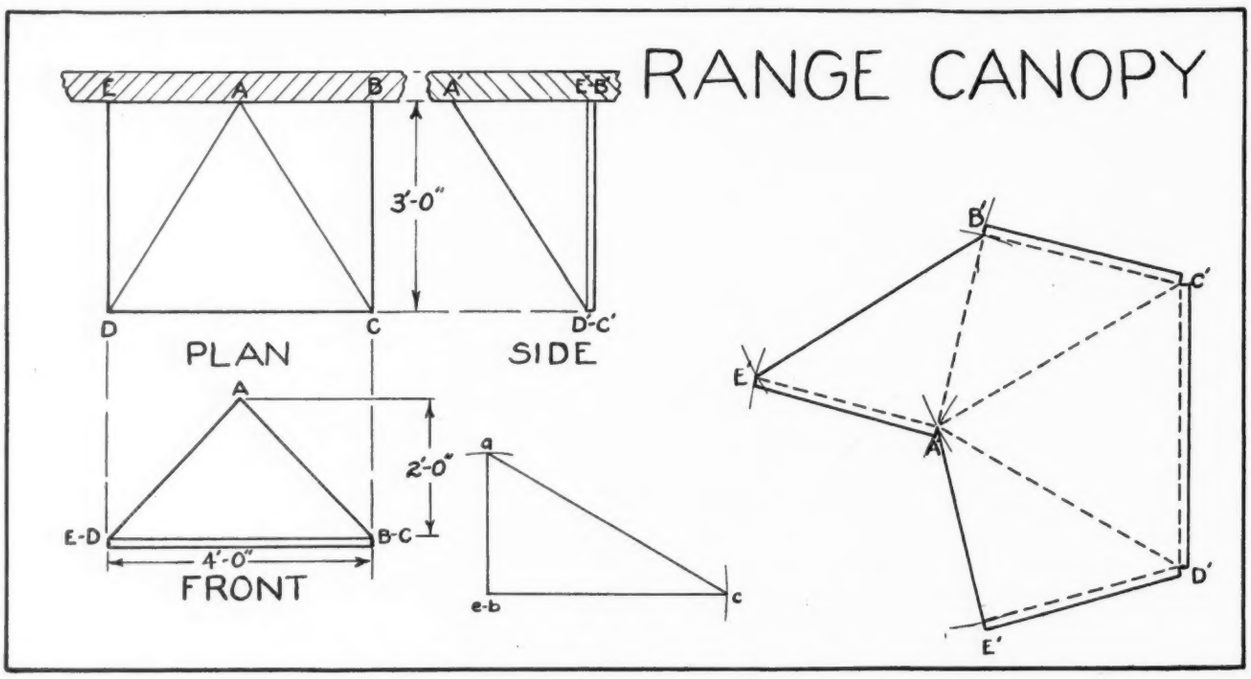
By W. R. Haines

THE pattern layout should require very little discussion, as the drawings are practically self-explanatory.

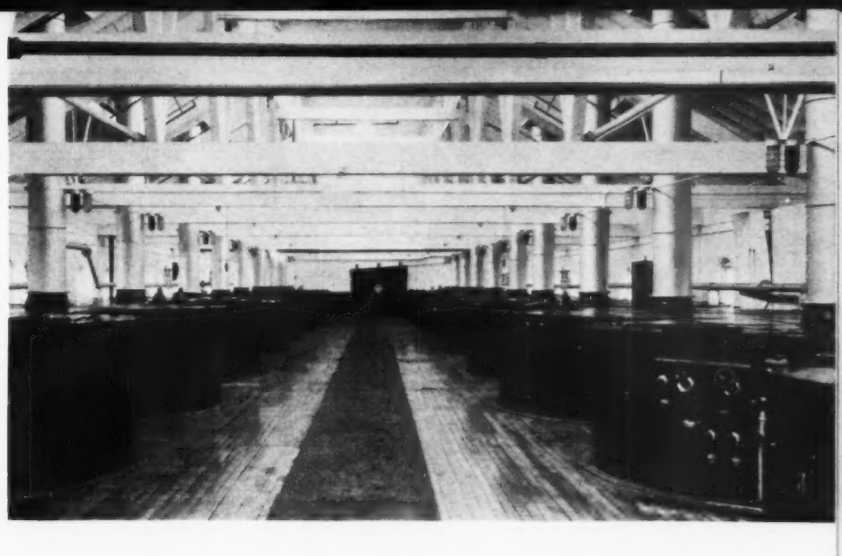
The pattern triangle *A'-E'-D'* is the section *A-E-D* in the plan view. The triangle *A'-D'-C'* is the section *A-D-C* and the triangle *A'-C'-B'* is the section *A-C-B*. The triangle *A'-B'-E'* is the back side of the hood and is the section shown by the front view of the canopy. The lengths of the pattern lines *A'-D'* and *A'-C'* may be determined by the triangulation method as shown by the triangle a-c-eb. The line from *a* to *e-b* is equal to the distance from point *A'* to point *E'-B'* in the side view. The distance from *e-b* to *c* is equal to the line *B-C* in the plan view. The hypotenuse of this triangle *a-c* is equal to the true length of the line *A-C* on the plan view, or the length of the line *A'-C'* on the pattern.

The final metal patterns should be laid out to save as much waste material as possible. It will be necessary to cut the pattern up into its triangular sections and allowing sufficient metal along the edges of the sections for seams in order to save material. The usual practice is to use the standing seam or the riveted seam in fastening the sections together.

A small condensation gutter is quite often used along the lower edge of a range canopy and is of advantage. This was not shown on the layout, as a request for it was not made.



Fabricating Procedure for Pipe of Stainless Clad Steel



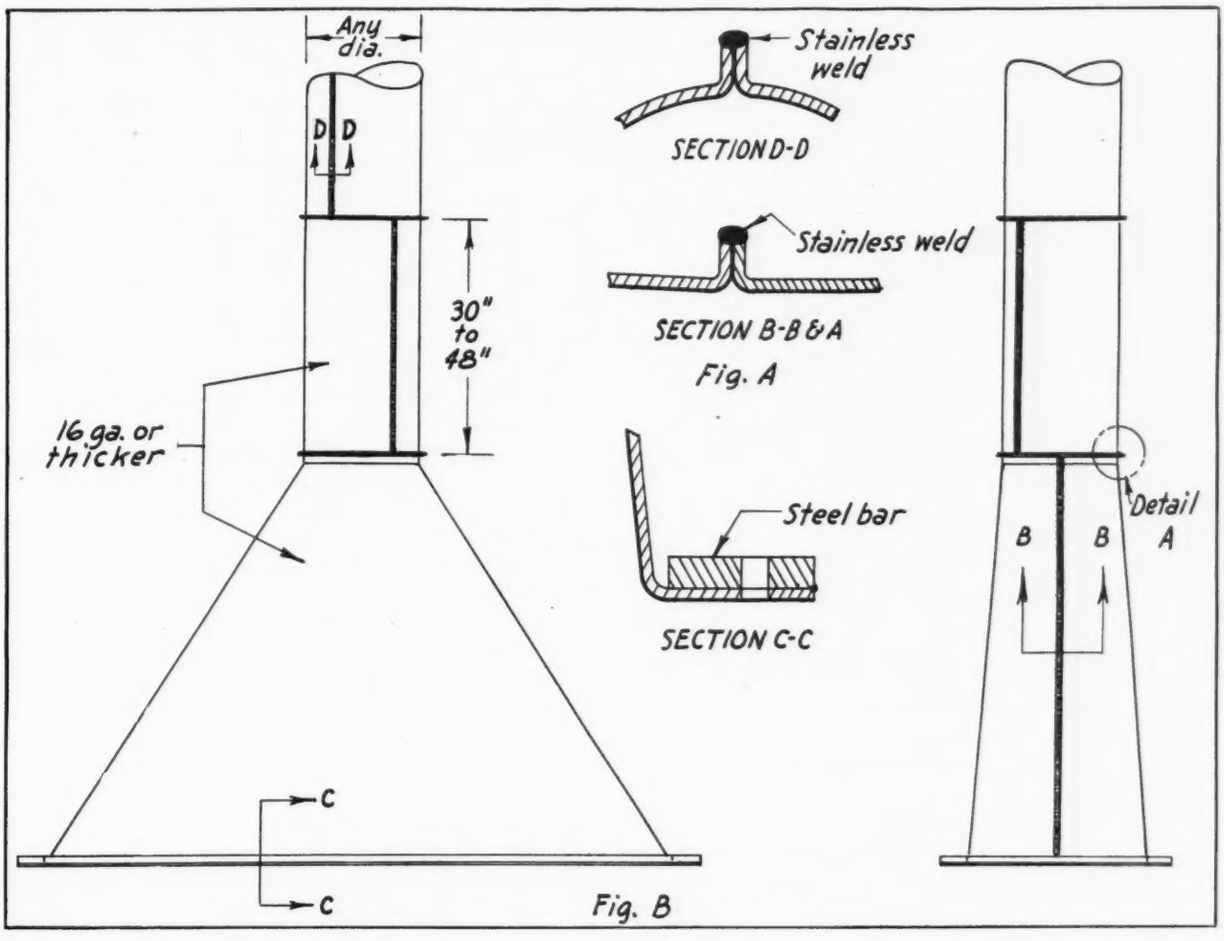
FREQUENT replacements of stacks, ducts and large diameter piping subject to corrosive attack have been eliminated in many industrial plants by adopting stainless clad steel construction. The soap industry was one in which heavy replacement costs for corroded stacks carrying fumes from soap kettles, were entirely eliminated through the use of special metals.

The Ingersoll Steel and Disc Division of the Borg-Warner Corporation, Chicago, has developed a fabricating procedure for stack, duct and piping construction that is said to assure complete stainless steel corrosion protection on the interior surface, combined with simplicity of fabrication.

In preparing the sheets, all edges are flanged outward, when formed or rolled into a section of piping there is, therefore, a peripheral flange at each end of the section and a longitudinal flanged seam, the length of the section. The straight flanges may be formed over a bar, or formed on an apron forming or press brake. In the cases of round piping the flange may be formed over a ring jig, or other satisfactory method.

All joints are welded on the projecting flanged edges. Note figure. "A." Welding may be done by either metallic arc or oxy-acetylene process, but stainless steel welding rod must be used to insure a complete stainless steel interior of the duct. Welding speeds of 40 to 60 linear feet per hour can be maintained without difficulty.

It is the usual practice to make up sections of the stacks or ducts in the sheet metal shop and make final welds in position in the field. If welding in the field is impracticable, sections may be connected by the use of van stone rings, or riveted or bolted together, using gaskets between sections.



Wisconsin's 23rd Annual Convention

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3rd V. P.—A. A. Walters, Milwaukee.
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Sergeant-at-Arms—W. R. Arndt.

◆ ◆

THE 23rd annual convention of the Sheet Metal Contractors Association of Wisconsin was held February 1 and 2 in Milwaukee, with contractors present from many cities and towns in the state, some represented by a substantial delegation, and with enthusiasm and encouragement decidedly noticeable everywhere.

President Palmer Hanson, opening the convention, declared that his principal object during the past year and his hope for 1937 was the greatly increased membership in various local associations and in the state organization.

Industrial Ventilation

R. F. Jeske, speaking on industrial ventilation and exhaustion, declared that although this activity has been followed by many contractors throughout the state 1937 finds not more than 75 per cent of all industrial or public buildings with modern ventilation. "The ventilation contractor," declared Mr. Jeske, "may be likened to a physician in that he is a purveyor of better health and is usually called in when something is wrong with the patient. For the patient he must prescribe certain changes which will alleviate aggravating conditions."

The speaker pointed out that many of the ventilating and exhaust systems now in use were designed many years ago and in the light of present practice are inefficient. Fans are oversized, motors are not sized for the work to be done, and the system as a whole can be improved greatly. Ventilation and material collection can be divided into three general classifications, as follows: 1. general ventilation; 2. local ventilation; 3. special installation.

General ventilation might be defined as ventilation which changes all the air within an inclosure, while local ventilation will exhaust fumes or gases from the immediate vicinity of the source of production and may not affect the other air within the inclosure. Special cases cover such conditions as require extraordinary precautions in the handling of material and also covers the general removal and separation of materials of production.

For the collection of fumes, Mr. Jeske recommended the abolishment of single hoods in favor of double hoods in which the air is collected at the source of origin through a narrow space made by placing an inner hood within the outer hood. Velocities are high, but these double hoods permit workmen to stand in close proximity to the source of fume origin and still do not permit any of the gases to escape. The Wisconsin Industrial Commission's code recommends 400 fpm. velocity; but the speaker suggested that 1,000 ft. velocity gave much better results. The Wisconsin code also governs the velocity to be used in the collecting branches connected to hoods, but common practice, explained the speaker, permits the enlarging of the main where branches are grouped together thus permitting lower velocities to the main with subsequent reduction in horsepower of the motor. The speaker suggested that many of the difficulties with material separation are due to the fact that the cyclones are not correctly designed and especially have the common trouble of the exhaust opening so small that air velocities are high enough to carry light materials out of the cyclone. Mr. Jeske illustrated on the blackboard a number of very interesting ventilation and material collection problems which he had encountered recently and explained just what was done to remedy conditions.

Ductless Ventilation

R. C. Guenther, speaking on the subject of ductless ventilation and chimney top work, declared that chimneys having poor draft can frequently be corrected by installing a suitable top with a revolving cap and raising the height of the superstructure so that wind does not have as much effect as it does upon a low and open chimney. The usual difficulty with open chimneys, explained the speaker, is that the wind can blow down the chimney, thus reducing draft and oftentimes resulting in smoking. A suitable revolving cap presents a closed face to the wind, but has the opening toward the direction the wind is blowing and thus the wind sets up a suction effect at the base of the cap. This tends to prevent wind from blowing down the chimney

and at the same time increases the negative pressure in the chimney.

Where two flues are connected to one chimney top, the practice today is to remove some of the masonry work between the two flues for a few inches down from the top and build an airtight hood over the two flues. The speaker illustrated a number of typical problems upon the blackboard.

"Lining Firepots"

M. W. Quinan explained methods and illustrated products for lining and patching furnace fire pots. Mr. Quinan showed the material in plastic form and explained just how it should be applied in order to secure satisfactory results. The recommendations given were that the grate should be covered with 5/8-inch board and a cardboard which is carried to the outside of the firepot. The plastic is then installed in layers approximately 2½ inches thick and should be lightly pounded back against the firepot surface. The exterior of the plastic should not be trowelled smooth, but should be cut with a putty knife or some other instrument which leaves a rough exterior surface. Trowelling brings the fine material to the surface and these fines later check or craze when subjected to heat.

"Stop, Look, Listen"

E. A. Scott, speaking on the subject: "Stop, Look and Listen," declared that things had happened in the industry faster in the last two years than in many years prior to that time. The speaker ventured the opinion that 1937, '38, and '39 will be a very critical period in the warm air heating and sheet metal industry.

"The advent of air conditioning has made itself felt throughout the industry, and the heating man is not alone in having prospered from the public acceptance of this new comfort factor.

"Air conditioning has made the public conscious of such conditioning factors as attic ventilation and automatic heat and today the industry faces the proposition of supplying cost data, both operation and installation, for all types of automatic heat.

"I do not believe that more than one attic in three is now adequately ventilated. The application of attic ventilation and insulation will do much to reduce the ultimate cooling cost. Too many men in the industry are still selling furnaces rather than heating systems. Large corporations entering the field have never sold on this basis; hence we may expect to find new merchandising plans compelling us to follow suit. Whereas in former years our chief worry was the manufacturer selling direct through branch offices, today our chief worry seems to be the large corporation who through advertising and intensive salesmanship is bringing to the public a new conception of winter and summer comfort. The sheet metal contractor who does both heating, ventilating and sheet metal work is fortunate because his operations cover twelve months of the year, whereas, the firm dealing only in heating must expect some 'off' seasons.

"Federal Housing Act"

Ex-governor A. O. Ebehart of Minnesota, speaking for the Federal Housing Administration, declared that he "believed the construction of better homes is the answer to practically every problem of business today. The construction of the homes needed at present will do much to solve the present social, unemployment and citizenship problems because the construction of homes will mean work for millions of mechanics now unemployed; better homes will mean a higher level of family life; and if we return once more to the condition in which the home becomes the center of family life, we will eliminate many of the present problems of citizenship. The construction of homes during the past two years and the anticipated gigantic construction in the next few years to follow has placed more than $200,000,000 of money in circulation and the future sums of money which will be spent for home construction are inestimable."

"Apprenticeship or What?"

A. Rausche, speaking on the subject: "Apprenticeship or What?" explained that the Milwaukee Vocational School deals with 17,000 students every week and declared that the apprenticeship situation may be likened to the raising of horses, in which we can not have horses without first raising colts. Mr. Rausche stated that the present practice of hiring mechanics from other firms may be all right for the contractor who hires the mechanics, but eventually some one will feel a shortage, and the only solution is the bringing forward of apprentices.

Mr. Rausche explained that the seven years during which we have had enormous unemployment has also been a period during which many mechanics have changed their occupation and are no longer interested in returning to the construction industry. These men cannot be replaced, excepting as we bring up new men. Under the Wisconsin plan, high school graduates are taken into the vocational school, but rather than taking a course of theoretical vocational work, these young men are placed in selected positions with contractors and get the theoretical or book training at night school. The practical work is supplemented by mechanical drawing, sheet metal theory, economics and business subjects to give the young man a thorough mechanical training, and also to fit him to understand business operations.

"Social Security"

Benjamin F. Beecher, field representative for the Social Security Board, declared that in the past three months more than 10,000 employers have been contacted in Milwaukee and that most of these employers of labor are willing to co-operate with the intent of the Social Security Act. Mr. Beecher explained that each year finds an increased percentage of persons beyond the age of 65. "These many millions of persons older than 65 must be taken care of and whether or not we care for them

under old age benefits or by poor relief, the fact remains that we still must take care of them. There are now approximately seven and one-half million persons past 65 and ten years hence we will have almost 15 million such persons. Of these millions, not over one-third are able to support themselves.

"Millions of these persons have absolutely no control over their old age status and because the country is growing more established, the low paid man finds it increasingly difficult to enter a high paid profession."

To explain the operation of old age benefits, Mr. Beecher cited the case of a man now 35 years old who earns $1,000 a year from the present until he reaches the age of 65. At the age of 65 he will be entitled to a benefit of $37.50 per month. In order to accumulate a sufficient fund of money to guarantee $37.50 a month beyond the age of 65, this same individual would have to lay aside $96.69 a year at 3 per cent compound interest and obviously the $1,000-a-year man working for thirty years stands little chance of laying aside approximately $100 a year.

"Modern Business"

E. J. Malloy, speaking on the second morning on the subject: "Modern Business," and referring specifically to the consumers' co-operative movement now under way in many parts of the country declared that these co-operatives are not new and that business men in general do not object to these co-operatives so long as the co-operative is subject to the same laws as those controlling the business man.

"The Oil Burner Business"

E. C. Fillbach, declared that he believes the oil burner industry has been responsible for a considerable volume of work turned over to the sheet metal shop. He declared that the oil burner industry really gained first recognition some 18 years ago, but that the progress has gained momentum year by year. The speaker declared that the popularity of the oil burner was largely responsible for the dissatisfaction with the then-existing furnaces because home owners buying oil burners to be installed in furnaces designed primarily for gravity operation with hand-fired coal found that many of these furnaces were inadequate for the oil burner operation and demanded furnaces which would be highly efficient under oil-burner operation. Mr. Fillbach made the interesting assertion that whereas burner-boiler units were the first units of this type to be produced, in the last two years the burner-furnace unit has far exceeded in sales numbers the burner-boiler unit, and that so far as the oil burner industry is concerned, the burner-furnace unit seems to be the logical answer to residential air conditioning.

"Future Air Conditioning"

Platte Overton, speaking on the subject, "Air Conditioning for the Home," prophesied some changes in engineering design and installation, so far in advance of present thinking, seemingly, that he very quickly had the convention demanding proof of his assertions and asking questions tending to bring out a full explanation of the suggestions.

"The first change which will come about will be a change in mental attitude by the contractor who will think in terms of comfort and not in terms of air change, register temperature, etc. The conditions which prevent maximum owner comfort at present are cold walls, cold ceilings and cold glass areas, and the next engineering advance is the design which will eliminate cold glass and cold wall areas.

Mr. Overton suggested that the most certain method for eliminating cold walls is to install registers in outside walls under windows or in window sills with register faces designed to direct a thin stream of air vertically toward the ceiling and thus shield the owner from the cold wall or glass surface by this thin curtain of warm air.

Also that register temperatures of 170 up to 200 deg. will be found practical for this particular type of installation and that our present worries over air changes will be abandoned and that one air change per hour may some day be accepted as standard practice. Mr. Overton gave as his reason for this belief the fact that six air changes or more per hour mean drafts in the house and that sufficient temperature without air change insures a comfortable condition. He explained that although we speak of air changes and think of air changes in terms of recirculating the air within any one room so many times per hour, actually we may be circulating only a very limited volume of the air without that room and the remainder of the air may be absolutely dead.

Another radical idea was the elimination of practically 90 per cent of the present return air grilles and substituting one or two large ones working approximately 100 per cent as far more efficient and conducive to better inside conditions. The speaker cited examples of installations where each second floor room had a return air, but when checked with the anemometer disclosed the fact that no return from the second floor was functioning beyond ten per cent capacity. He suggested that the descending blanket of cold air down stairways may be broken up by injecting a stream of warm air from the riser of a stair a few steps above the bottom.

Another interesting assertion was that the warm air registers are all important and returns relatively unimportant. If air is pumped into the room, the room will be warm and the cooled air will escape unless the room is absolutely air bound and no amount of cold air return ordinarily will effect the air movement within that room. This particular point was seized upon by several members of the association who objected strenuously. Mr. Overton suggested that register velocities (with suitable registers) may shortly be 1,000 fpm. and velocities in main ducts in the basement have steadily increased from the first 400 to 500 fpm. to the present 1,200 to 1,500 fpm. and that in accordance pipe sizes all through the system are being reduced.

(*Continued on page* 94)

RESIDENTIAL AIR CONDITIONING SECTION

THE series of articles by S. Konzo has been running for quite some time and numerous facts of value to the engineer have been explained as only Mr. Konzo can explain them.

- - - But in our judgment the present group of articles dealing with several different methods of designing duct systems is about as valuable as any group in the series. These articles on design are important, we feel, because they show that there is more than one way to size a system and the man who never deviates from one procedure may be overlooking methods which have definite advantages under certain conditions.

- - - If you have not gathered this group for reference we suggest that you do so and design a simple system by each method to appreciate the advantages of each plan.

- - - Numerous inquiries have been received asking for additional information on the Michigan State College short course. There is a resume of the program in this section and suggestions for getting information.

WATERLOO

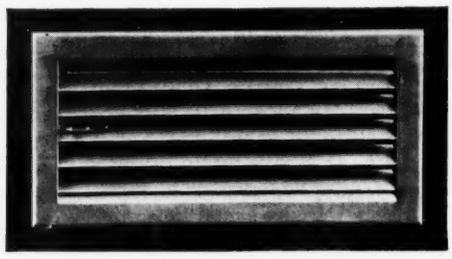
Air Conditioning REGISTERS

New Business Ahead in '37

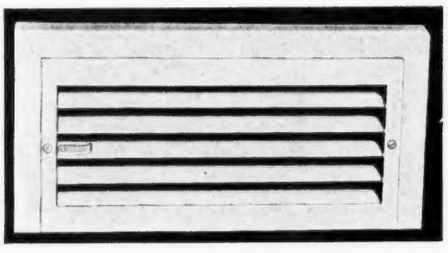
. . . with the registers that are making register history

Money-making opportunities never excelled in the heating field open up this year for Waterloo dealers—handling the new Waterloo "Venetian blind effect" registers. For, these "registers of tomorrow" set a new standard of beauty that adds 50% to their sales appeal. They're new as the newest home. Designed in the modern mode with distinctive straight-line simplicity. And, besides, providing a host of important exclusive mechanical advantages, including—

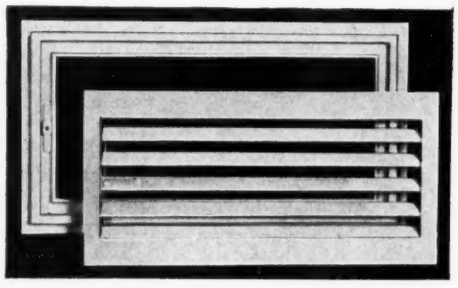
Slanted louvres which reflect light and color, conceal the ducts—Complete adjustable control of air flow (90-degree range)—Positive lock mechanism—Tested capacities.



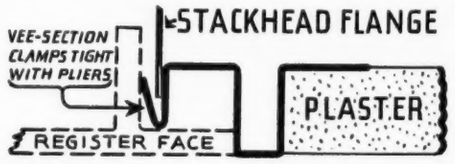
FH-100—Adjustable one-piece Venetian Type Register for walls.



FHD-204—Two-piece Venetian type adjustable register for baseboards.



FH-102—Venetian Type adjustable register for walls, with Vee-U plaster frame.



The Waterloo Vee-U Frame assures positive, tight connection with stack-head.

Waterloo Register Co.

Floor Registers . . . Floor Cold Air Faces . . . Baseboard Gravity Registers . . . Wall Registers . . . Oakwood Faces . . . Steel Grilles . . . And All Furnace Supplies

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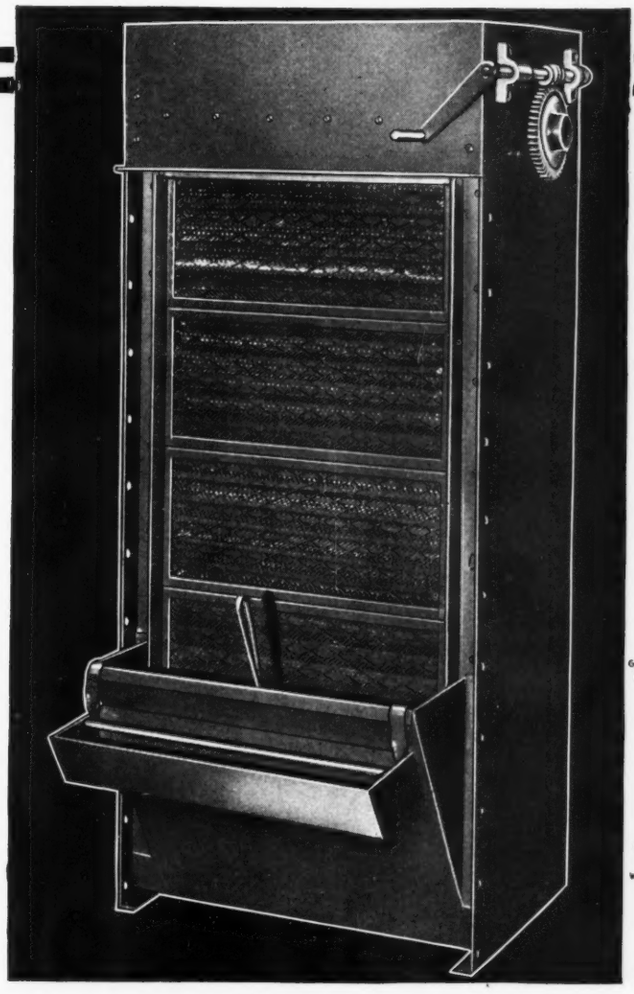
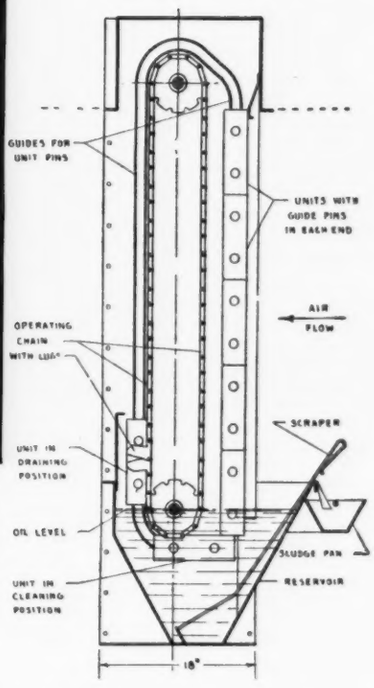
THE *New* AMERICAN UNIMATIC SELF-CLEANING AIR FILTER



A particular feature of the Unimatic is its single-pass filter curtain which makes possible the use of Progresso-Pak filtering media with its lower resistance and greater dust holding capacity.



Schematic Drawing Showing Self Cleaning Operation

HERE at last is a self-cleaning filter designed for small and medium sized air conditioning systems ranging in capacity from 1,000 C. F. M. to 30,000 C. F. M. It brings to air conditioning the advantage of uniform air flow and constant resistance with semi-automatic operation.

The Unimatic is furnished with either a hand crank or motor drive with push button control.

Write for complete information.

AMERICAN AIR FILTER CO., INC.

Incorporated

113 Central Ave., Louisville, Kentucky

In Canada: Darling Bros., Ltd., Montreal, P. Q.

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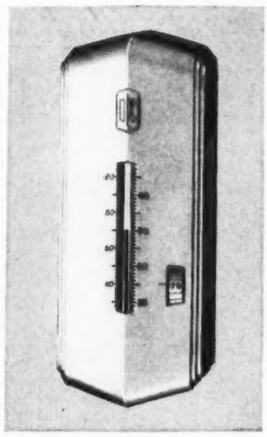
EVERY CONTROL YOU NEED

for Stoker Satisfaction

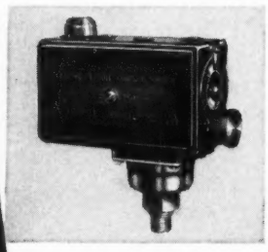
● The controls and how they are used largely determines the measure of satisfaction your customers will derive from their stoker installation.

When you standardize on "Genuine Detroit" controls you are assured that every unit in the system is engineered to operate effectively with all other units and that all have been proven by years of service in the field.



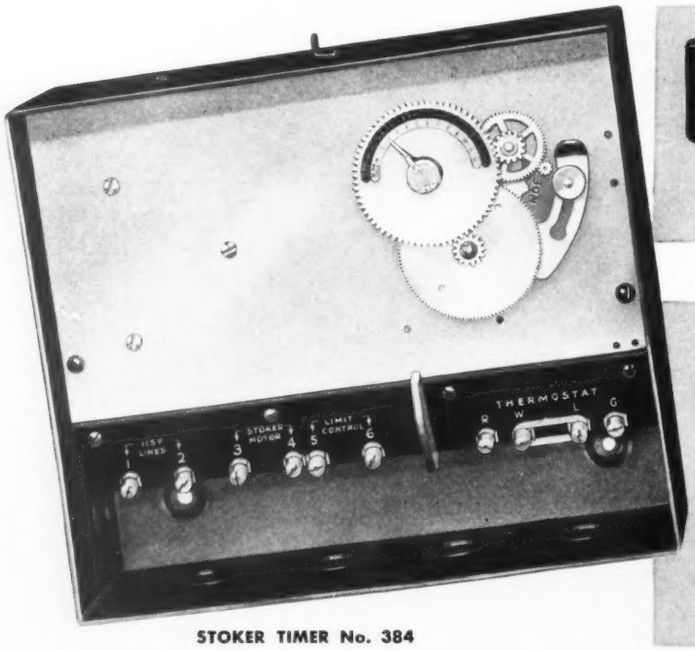
No. 211 THERMOSTAT

This is an attractively styled instrument incorporating more advantages than any other unit available. It is sensitive, accurate and reliable. It is furnished with or without heat compensation, and in models for summer and winter, or day and night. ● Write for Bulletin 86.



PRESSURE LIMIT CONTROL SWITCH No. 250

Sturdy and reliable controls, sensitive in operation and quickly adjusted. Available in several models for every application from vacuum or low pressure to high pressure boilers. ● Write for Bulletin 54.

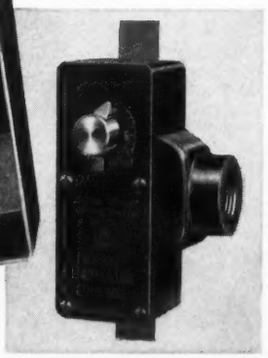


STOKER TIMER No. 384

The No. 384 Time Relay for Standby Control is a sturdy, flexible unit adjustable for short-interval, periodic firing. Its firing period is readily set by a knob and pointer. A 30 or 60 minute total time cycle is quickly selected by a simple gear shift. This eliminates the need for changing gears or cams.

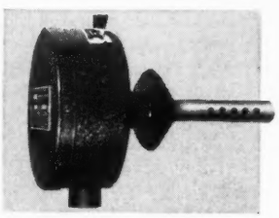
The No. 384 has easily accessible terminals for Thermostat, Stoker, Motor, Line and Limit control connections. Convenient push-outs facilitate wiring.

This unit is entirely free from all hum and chatter during operation. It is furnished also with Double Pole Safety Switch under the number 385, or as a Timer only, under the number 386. ● Write for Bulletin 94.



CLAMP-ON CONTROL SWITCH No. 251

Clamped to hot water pipe, the No. 251 limits stoker operation according to the temperature of the hot water. ● Refer to Bulletin 54.



FURNACE LIMIT SWITCH No. 255

Installed in the furnace bonnet, it breaks the stoker circuit at a given maximum allowable furnace temperature. ● Write for Bulletin 64.

OTHER STOKER CONTROLS

Furnace Fan Switch No. 244. ● Combination Fan and Limit Switch No. 253. ● Immersion Temperature Control Switches for Taco-Abbott Systems and jobs equipped with hot water Circulator ● Low Water Cut-out No. 257. ● Boiler Protector No. 545 ● Stand-by Control No. 275 (stack temperature type). ● Out-fire Control No. 265. ● Relay Transformer No. 298. ● Time Switches for Night and Day Thermostat.

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FURBLO CHARGES ONWARD

New streamline styling—New type Blower —New top mounted motor—New Multi-speed pulleys. FURBLO units for 1937—LOOK better — WORK better and ARE better.

But a further important feature has been added

"A FURBLO WARRANTY *in writing*."

This FURBLO WARRANTY *in writing* will be placed in a sealed envelope and attached to the blower wheel of every unit. It must be removed before starting a FURBLO. This FURBLO WARRANTY is the buyer's and user's assurance that a FURBLO is Better—is BACKED *in writing* by the maker—A manufacturer who backs the installing dealer 100%.

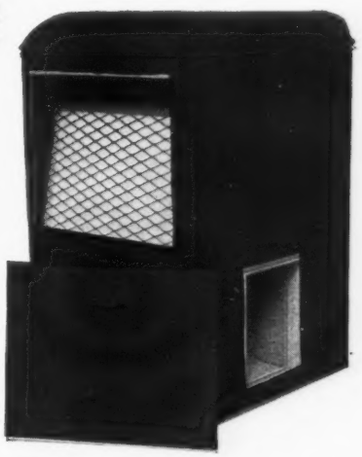
Start 1937 with FURBLO—FURBLO will lead the Warm Air Heating and Air Conditioning Dealer and Jobber over the TOP with new "styled" models—new advancements—a WARRANTY *in writing* and products of continued high quality and high efficiency.

New Cooperations, in merchandising—in engineering will be provided the dealer and jobber alike.

FURBLO will maintain leadership for FURBLO dealers with a WARRANTY *in writing* which will gain and keep consumer acceptance and satisfaction. FURBLO Charges Onward with an ear to the ground and an eye to the future.

If you are a live, progressive dealer, line up with FURBLO and go over the Top with a year around profit volume. Write today for full description of the 1937 FURBLO models, the FURBLO WARRANTY *in writing*—Do it now!

ACT NOW!



The new 1937 model with graceful streamline styling and many mechanical improvements, such as a new type blower, top mounted motors and multi-speed pulleys.
Backed by a WARRANTY *in writing*.

ENROLL

FURBLO INSTITUTE

The Air Conditioning Sales and Engineering School of the mails.

NO TUITION — NO FEES

FURBLO COMPANY

HERMANSVILLE MICHIGAN

AGAIN NORGE LEADS!

WITH THE GREATEST LINE OF SUPER-EFFICIENT HOME HEATING AND AIR CONDITIONING EQUIPMENT EVER OFFERED

Make money on Heating and Air-Conditioning Equipment in 1937 . . . get into the Norge picture and sell efficiency no one else can meet—economy no one else dare offer—and an initial cost that will make it easy to close sales on the spot.

Get full details of the pace-setting Norge home heating equipment *today* from the Norge distributor in your territory. It's one of the greatest propositions ever offered to dealers—and liberal finance plans make it easy to be a Norge dealer.

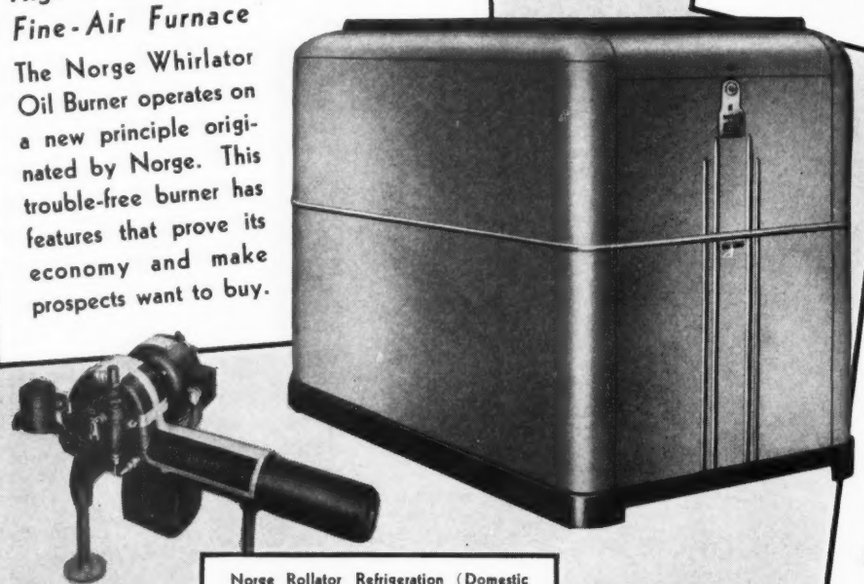
NORGE HEATING AND CONDITIONING DIVISION *Borg-Warner Corp.*, Detroit, Mich.

THE NORGE FINE-AIR CONDITIONING FURNACE *Cuts Home Heating Costs in Half!*

Saves up to 50% in cost of operating an old-fashioned heating plant. When prospects hear that they're already half sold. Other vital differences can be demonstrated—actually proved—and when you have fully explained Norge Fine-Air Furnace, you'll find sales closing themselves.

THE NORGE WHIRLATOR OIL BURNER *High Efficiency Companion to the Fine-Air Furnace*

The Norge Whirlator Oil Burner operates on a new principle originated by Norge. This trouble-free burner has features that prove its economy and make prospects want to buy.



THE NORGE GAS BURNER *Cuts Gas Heating Costs As Much As 50%!*

Triple control gives economy never before possible with gas. Tests prove Norge has the most efficient gas burning unit on the market.

HC-1

Norge Rollator Refrigeration (Domestic and Commercial), Ranges (Gas and Electric), Washers and Ironers are the new performance and style leaders in 1937.

SEE THESE SENSATIONAL 1937 NORGE APPLIANCES

IF YOU WANT TO MAKE MONEY ON HEATING EQUIPMENT IN 1937

INVESTIGATE NORGE { SEE *the difference* / SELL *the difference* / POCKET *the difference*

The MOTOR that Made HISTORY~

LOWER STARTING CURRENT THAN ANY OTHER TYPE MOTOR

For more than 33 years Century Single-Phase, Brush-Lifting Motors have made history—eliminating the extra cost of over-motoring, because they have a lower starting current and a higher starting torque than any other type motor.

Long before Air Conditioning was even thought of as an industry, they established many outstanding performance records, driving Refrigerating Machines, Compressors, Pumps and all similar Air Conditioning equipment—in all kinds of service, in all climates, in all parts of the world.

They were more than adequate and ready for Freon Compressors long before Freon Gas was ready for refrigeration.

Find out about the low starting current and high starting torque advantages of Century Single Phase Brush Lifting Motors—they carry the load, economically!

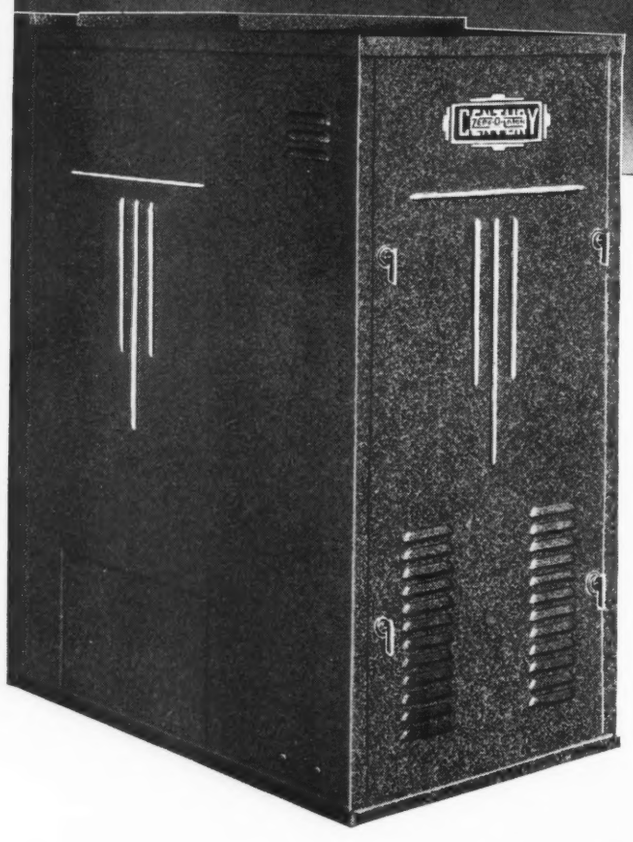
●

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

REPULSION START INDUCTION BRUSH LIFTING

Century MOTORS

first in the Low Price FIELD



Take your cue from the automobile industry. The biggest sales and dealer profits are in the low price field. It's true in oil burners, too. That's why Century has been first to offer all the refinements of higher priced makes plus dozens of outstanding exclusive Century features, in a complete line of low priced automatic oil heating equipment. Conversion Burners, Boiler-Burner Units, Warm Air Conditioners, and Hot Water Heaters.

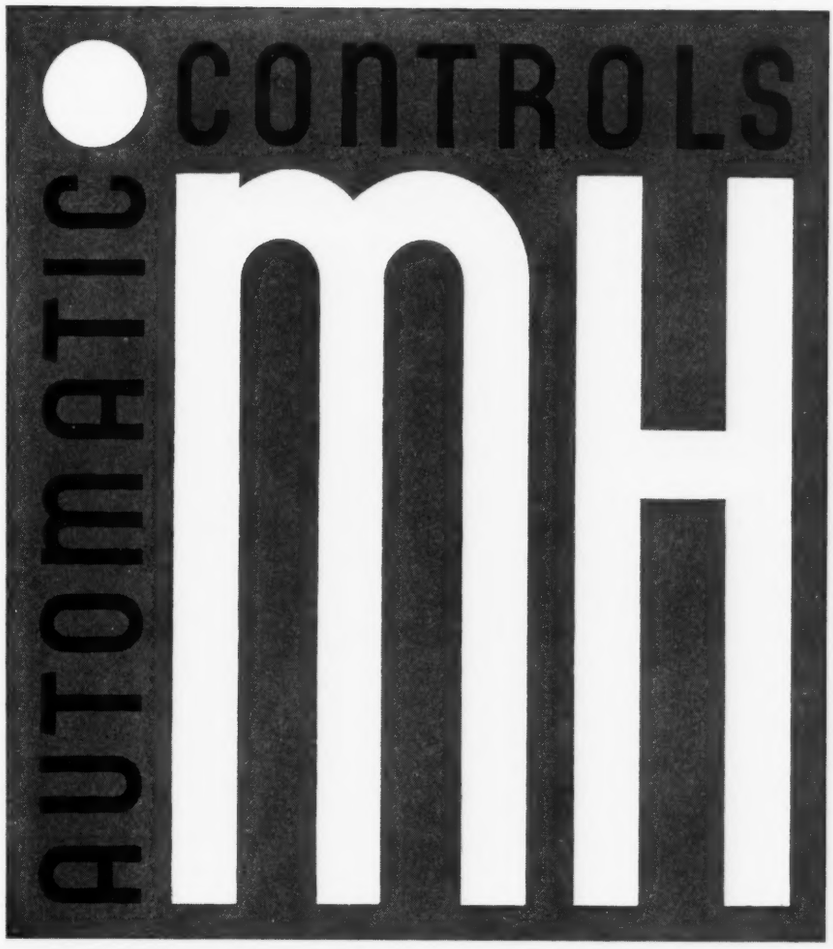
Without sacrifice of workmanship or materials, but through economy of manufacture, simplicity of designs, major improvements, and mass production, Century enables dealers to do a volume business . . . more sales . . . more profits . . . and a bigger gallonage if you're handling oil.

Today, write for facts about the Century dealer money-making franchise. Get details of the new Century Model J Conversion Burner with the new and Improved Floating Flame, Even-Flo Combustion, and the utterly new and different type fuel unit; Zeph-O-Lator, Century Boiler-Burner Units, and Hot Water Heaters. Then get advance information on Century's nationwide advertising and sales promotion. A smashing campaign to give thousands of American women Furnace Freedom. Write at once. THE CENTURY ENGINEERING CORP., Cedar Rapids, Iowa.

ZEPH-O-LATOR, a radically new and different type warm air conditioning Furnace Unit. Impartial tests prove 85 per cent FUEL RECOVERY! Dealers now ordering in carload lots to supply the tremendous demand. Get complete information, discounts now!

CENTURY

Conversion Burners . . . Boiler-Burner Units
Warm Air Furnace Units with Air Conditioning
Hot Water Heaters . . . . . Humidifiers



MINNEAPOLIS-HONEYWELL AUTOMATIC CONTROLS

Will Increase Your Profits through . . . . .

1 More and larger sales due to ready acceptance.

2 Repeat sales from satisfied users.

3 Reduced sales resistance by national advertising.

4 Minimum service costs because of dependability.

5 A complete line necessitating only one stock.

6 Readily available stocks in principal cities.

Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota . . . Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL

Control Systems

BROWN INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING

How to get the LION'S

of Automatic Heat and Air-Conditioning Business in Your Community

People in all parts of the country are demanding the Herman Nelson Oil Burning Air-Conditioning Furnace. Built from the ground up to deliver Automatic Heat and Air Conditioning economically, all misconceptions of the past and unnecessary gadgets have been eliminated. The result is a simplified unit that heats, humidifies, filters, cools, dehumidifies and circulates the air as required. The Herman Nelson unit occupies far less space than others performing like functions. Immaculate in function and appearance, this unit brings the Herman Nelson dealer a large and profitable business.

With its efficient operation, lower fuel costs, simplicity and advanced design, the Herman Nelson Conversion Oil Burner also presents unlimited sales opportunities. The result of painstaking research and testing, the Herman Nelson Oil Burner has been awarded first prize for mechanical excellence and attractive appearance in the Annual Product-Design Contest of a leading trade publication.

Other products in the Herman Nelson line include an Oil Burning Boiler, Automatic Stoker, Coal Burning Air-Conditioning Furnace, and Self-Contained Summer Air-Conditioner. Every product has been thoroughly tested in actual service as well as in modern laboratories by skilled engineers. The Herman Nelson dealer does not have to recommend one unit as the solution for every modern heating problem.

With the complete line Herman Nelson Dealers are in an enviable position to go after *all* the profitable Automatic Heat and Air-Conditioning business in their communities.

THE HERMAN NELSON CORPORATION, MOLINE, ILLINOIS

A COMPLETE LINE OF AUTOMATIC HEAT AND AIR-CONDITIONING EQUIPMENT

Oil Burning Air-Conditioning Furnace

Conversion Oil Burner

Oil Burning Boiler

Self-Contained Summer Air Conditioner

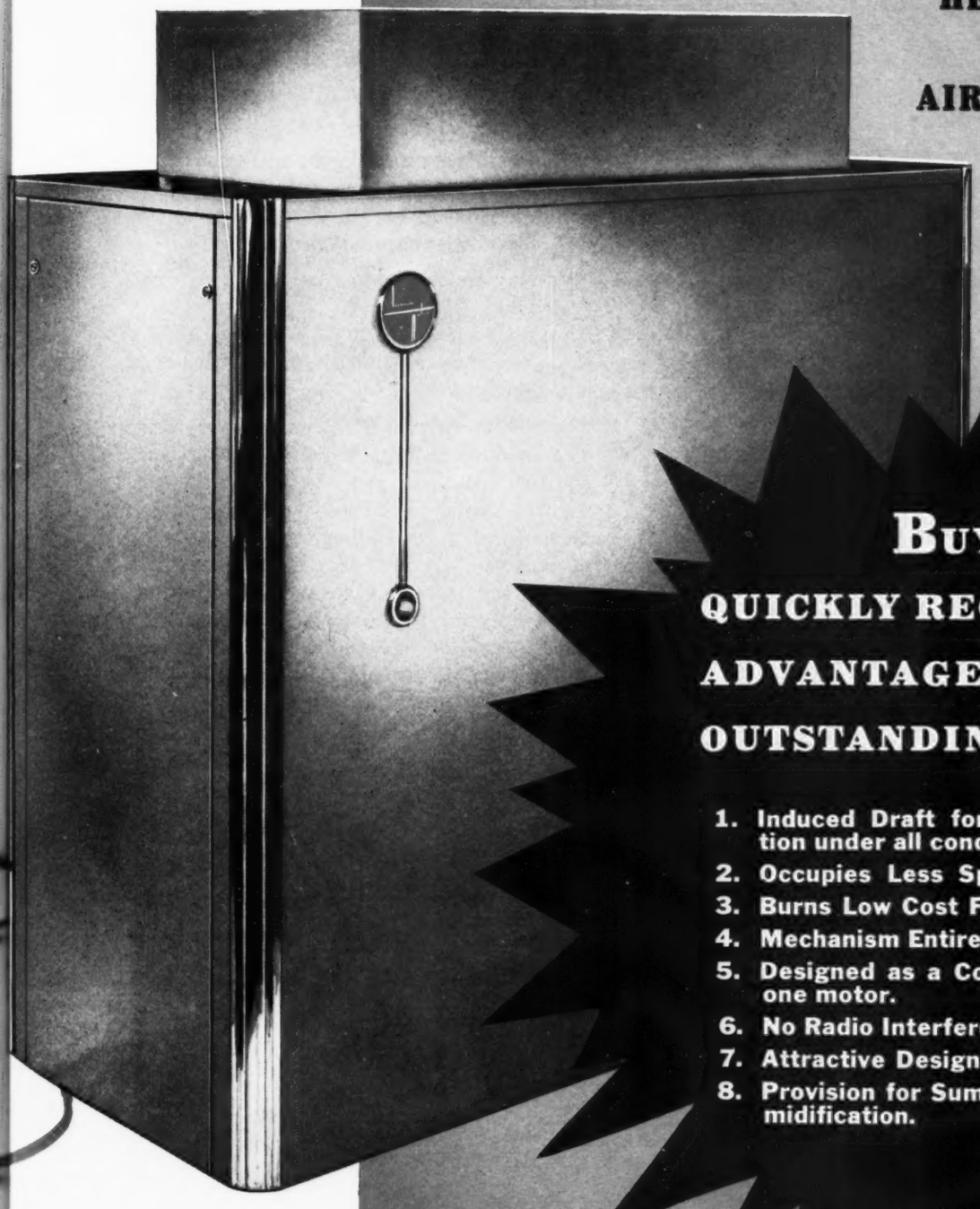
Coal Burning Air-Conditioning Furnace and Automatic Stoker

herman nelson moline illinois

HERMAN

S SHARE ~ ~

HERMAN NELSON
OIL BURNING
AIR-CONDITIONING
FURNACE



BUYERS
QUICKLY RECOGNIZE THE ADVANTAGES OF THESE OUTSTANDING FEATURES

1. Induced Draft for most efficient operation under all conditions.
2. Occupies Less Space than other units.
3. Burns Low Cost Fuel.
4. Mechanism Entirely Enclosed.
5. Designed as a Complete Unit using only one motor.
6. No Radio Interference.
7. Attractive Design with chromium trim.
8. Provision for Summer Cooling and Dehumidification.

N NELSON

IN EVERY SALE
THERE ARE TWO SALESMEN

ONE IS YOU—THE OTHER, THE VOICE OF QUALITY. You—even with the most expert sales technique—can make sales only when your prospects feel that they are receiving high-quality warm-air-heating and air-conditioning equipment.

You may quickly arouse attention, interest, and desire, but you get the contracts only when the convincing VOICE OF QUALITY tells your prospects that they are getting their money's worth.

The G-E monogram is recognized everywhere as a mark of high-quality electric equipment, and G-E motors on the warm-air-heating and air-conditioning equipment you supply convince prospects at a glance that the electric equipment is the best that expert engineering and skilled workmanship can produce. This assurance, coupled with your reputation as a reliable heating contractor, gives prospects added conviction that you supply high-quality equipment. It makes selling easier.

Use G-E motors on your warm-air-heating and air-conditioning equipment and thus amplify the sales voice of quality. Let these capable assistants do more of the actual selling. General Electric, Dept. 6A-201, Schenectady, N. Y.

LET G-E MOTORS HELP YOU SELL

HIGH-QUALITY FEATURES

Cast-aluminum Rotor—Indestructible one-piece pressure casting; no soldered or welded joints to cause high-resistance spots.

Protected Windings—Special treatment solidly bonds the individual turns and protects them against moisture, oil, mild acids and alkalis, and abrasives.

Quietness—Scientifically proportioned rings of live rubber effectively isolate vibrations. Motor operation does not interfere with radio reception.

070-165

GENERAL ELECTRIC

You Tell 'Em— but When and How?

By R. Louis Towne

NESTOR said, "The secret of a great victory lies in getting a good ready."

This old Greek General was a successful soldier, but if he had been a contractor or a sales manager or even a salesman he would have been just as successful. He had learned one important thing—You must know *today* how you are going to do it *tomorrow.*

We've been out census taking (canvassing). (See January issue). We've seen that information is not hard to get and that get it we must if we ever hope to cash in at the order window. Now, what are we going to do with it?

We cannot pull our prospect cards out of the file blindly and expect to close orders. Like eating peas with a knife—it just isn't done. We must take each card, analyze it, compile selling dynamite in orderly fashion, learn our story as thoroughly as the concert musician learns his repertoire and deliver it with the skilled technique of a master.

And before we can possibly do this we must sell ourselves on one important sales fundamental. That is:

Prospects Must See the Advantages

You've heard it said, "I'm from Missouri"—"Seeing is believing"—and other similar phrases. Do you know why they have gained so much credence?

It's because none of us will buy until we *see* what we *think* we want!

Some things we'll accept on faith, but not when we are spending our hard earned money.

Make this little test yourself. Try right now to imagine yourself talking to a prospect and using no phrases such as, "I'll show you the advantages."

Why, you always say such things as, "Your home will be just as comfortable, etc."

What's happening? You're *painting* a *picture* with words. You're making an impression in *picture form* on the mind of your prospect.

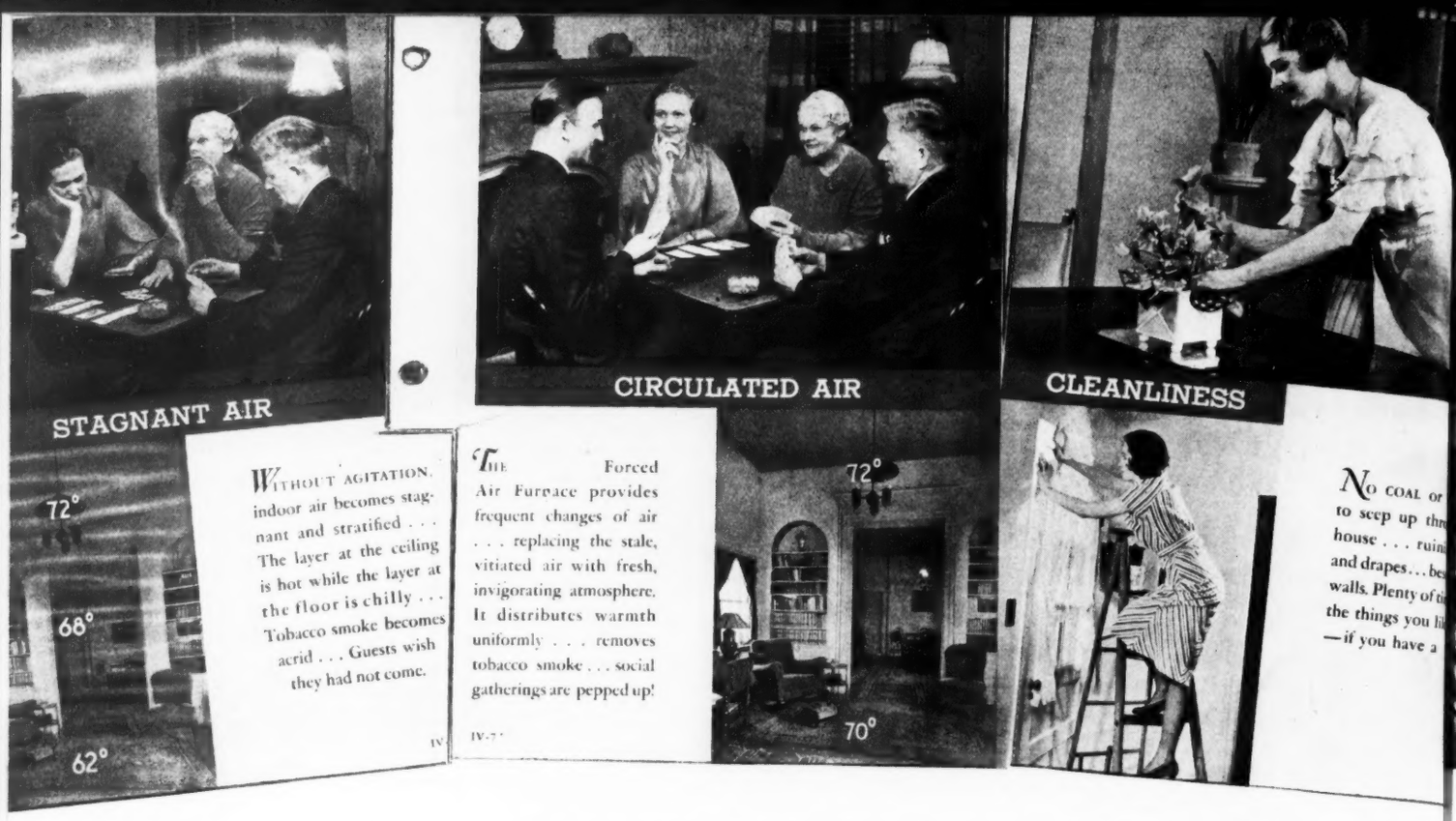
What's the answer? You've got to make your planned presentation with real *pictures* to show your prospect what he's missing. You've got to portray the vast difference between what you want him to have and what he has now. He must see a picture of comfort and another of discomfort. You must depict convenience and inconvenience. Want proof of this?

Did you ever see the hair restorer ads in the paper?

Use your visual sales manual upside down (to you). Have both man and wife together (that's part of the stage setting). Then watch your prospect—you can do it if you know your subject thoroughly. And watch the lady.

Above—Don't argue. Hundreds of salesmen have won arguments—but lost the order. Look up the answers to objections before hand and answer objections by showing pictures.

Be pleasant and enthusiastic when presenting the order—but don't try to be funny. Don't call the man's signature "your John Hancock." Don't dash away as though afraid—and don't stay as though you needed a drink.


STAGNANT AIR
72°
68°
62°
WITHOUT AGITATION, indoor air becomes stagnant and stratified . . . The layer at the ceiling is hot while the layer at the floor is chilly . . . Tobacco smoke becomes acrid . . . Guests wish they had not come.
CIRCULATED AIR
THE Forced Air Furnace provides frequent changes of air . . . replacing the stale, vitiated air with fresh, invigorating atmosphere. It distributes warmth uniformly . . . removes tobacco smoke . . . social gatherings are pepped up!
72°
70°
CLEANLINESS
NO COAL or
to seep up thr
house . . . ruin
and drapes . . . be
walls. Plenty of t
the things you li
—if you have a

These pages from a visual sales manual (actually in use) illustrate how the story can be told in pictures. A striking photograph plus a few words of explanation brings out the point for both eye and ear. You do less talking—the prospect gains a vivid mental picture.

Or the ads for reducing methods? Almost always they show the bald headed man and then the same man with luxuriant locks—the big fat woman and the same woman as slender as a sylph. These ads simply make the bald men and the fat women picture *themselves* as *they want to be*. . . .

And so a sale is made.

The Visual Manual

And further proof!

Psychologists after years of research tell us that—

"Of all the impressions we receive, the eyes record 87%, the ears only 7%.

We remember—

1/10 of what we hear

3/10 of what we see

BUT

5/10 of what we both see and hear."

Why do you suppose all the money is being spent developing television? It's because people need pictures for complete, easy understanding.

Why do you suppose almost all the large manufacturing firms in the country spend thousands of dollars annually on visual sales manuals? Only one reason—*They Sell!*

Now you ask, "Where can I get a visual presentation and how do I use it?" Thank goodness ours is a progressive industry. Almost every manufacturer in the heating and air conditioning field have visual sales manuals for you. Some give them away, some sell them for the cost of preparation (these latter are usually the best) and if you ask you can get them.

When you get it, study it. Learn it so thoroughly that you can talk from it when it is *upside down*. With it upside down you can watch your customer's reactions every minute. Don't get any "canned" sales talk ideas from this. These aren't so good in this day of discriminating buyers. But understand this one thing. A visual sales manual manages your presentation step by step and keeps *you* (and the prospect) from wandering off the subject.

That Important Survey Card

In a good visual sales manual there is usually a lot of material. You don't have to use it all. In "getting your ready" you study the information you have tabulated on your prospect card. Then you build your presentation.

Suppose, for example, your card reveals that Mr. Jones has a family of five—that Mrs. Jones does her own housework—that one of the children is not any too well—that Mrs. Jones is the type of woman who

RECORD AND SURVEY OF CUSTOMER'S APPLIANCES

OWNER ✓ RENTER ____ NAT. AMER. OCC. PLANT SUPT.

NO. IN FAMILY 5 INC. 2 CHILDREN 1 MAID HOME VALUE $10,500 RENTAL ____

BRICK ✓ FRAME ____ BUNG. ____ 1 STY. ____ 2 STY. ✓ HSE. RATING FAIR

APPLIANCE	CONDITION GOOD	CONDITION BAD	FUEL	REMARKS
RANGE	✓		GAS	
REFRIGERATOR	✓		"	
LAUNDRY STOVE				
WATER HEATER TANK		✓	"	GOOD WATER HEATER PROSPECT
HEATING AUTO.				
HEATING STEAM BOILER				
HEATING HOT WATER BOILER				
HEATING WARM AIR FURNACE		✓	COAL	10 YRS OLD - FIRE OWN FURNACE

SOURCE OF PROSP. CANVASS

FORM 502 A

One side of a survey card with information from which you can plan your presentation.

VENIENCE
KINDLING FIRES . . . shoveling coal . . . adjusting dampers and draft doors . . . shaking grates . . . carrying ashes . . . endless climbing of cellar stairs . . . constant worry . . . are eliminated by
1-8
MOISTENED AIR
ENJOY THE zestful, exhilarating tang of moist north woods air . . . Let the humidifier correct the moisture deficiency in your home . . . protect furnishings . . . contribute to plant growth . . . and provide the first requisite to a beautiful complexion—a soft, smooth, healthy skin, by routing beauty's worst enemy—parched air.
FLUCTUATING temperatures have a marked and unwelcome effect on family health . . . is a guaranty against sudden chill . . . and stifling heat . . . and doctor bills.
1-11
HEALTHFU
RESPIRATORY DISEASES
DIGESTIVE 8.9%
EPIDEMIC, ENDEMIC AND
NERVOUS SYSTEM 4.1%
EXTERNAL CAUSES 2.1%
PUERPERAL 2.9%
GENERAL 2%
HEART AND CIRCULATORY SY
SKIN 1.6%
OTHER CAUSES 1.1%
EAR AND MASTOIDS 1%
KIDNEYS AND ANNEXA 1%
GENITO-URINARY 1%
EYE AND ANNEXA .7%
TEETH AND GUMS .7%
BONES AND ORGANS OF LOCOMO

Another group of pages from a visual sales manual illustrating how the points you want to impress are presented in such a manner that the prospect can hear, see, comprehend.

you have observed spends a lot of time in beauty parlors, or beautifying herself.

Doesn't it sound logical that in making your presentation you should stress cleanliness—health—convenience—and how your conditioning system by eliminating harsh, dirty, dry air; will actually contribute to Mrs. Jones beauty by protecting her skin? Can't you see the appeal to her mother instinct when you stress even temperatures—freedom from drafts—correctly humidified air—and how these things protect children's health?

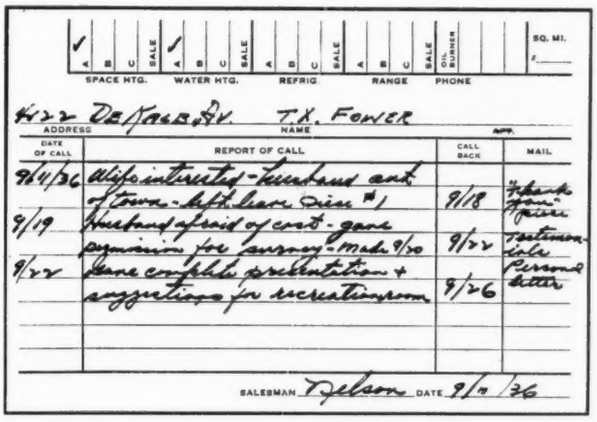
Look at these pages from a visual sales manual. Don't they tell this story at a glance? You bet they do, and if you take from the prospect card all of the information you obtained in making your census, your presentation can't miss.

Briefly, here's what your visual sales manual should consist of:

1. Tabbed index.
2. Creative Section. (All advantages pictured).
3. Installation Section. (Before and after pictures).
4. Testimonial Section.
5. Rebuttal Section. (To answer objections).
6. Mechanical Section. (Literature on products).

Then there's just one more thing you'll find important in preparing for the presentation. That is the preparation of your prospect. A pre-call letter or an appropriate mailing piece will often help you make a definite appointment for the presentation. Previous to your presentation, of course, you want to make your heat loss survey.

Mailing your prospect a letter asking permission to make this survey at no cost or obligation to the prospect will give you the chance to make the definite night appointment to talk to man and wife together. Time this direct mail effort so that it can be followed up within 24 hours. That is important. You must make *many* calls to sell automatic heating equipment and your timing must be perfect.



Reverse side of survey card with spaces to record the progress of the sale from canvass card to closing order.

Prepare Yourself

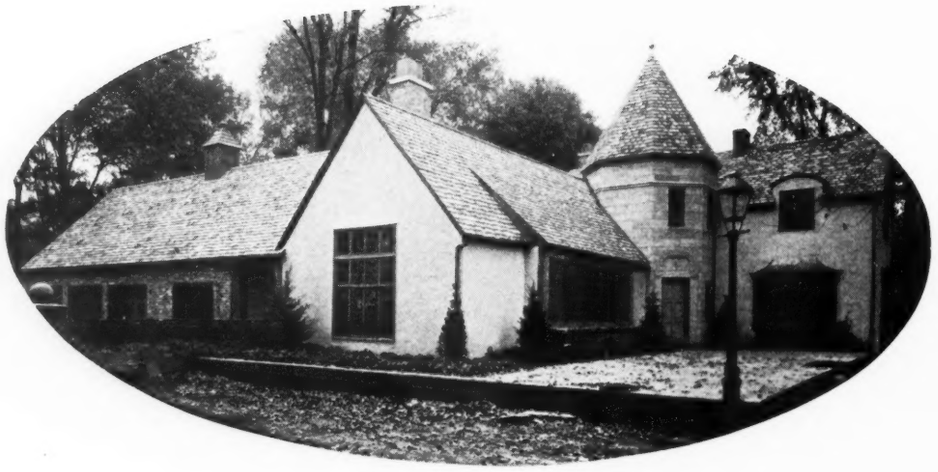
Now we're ready to move in. We have our information, we've prepared the prospect, we've built our presentation, we've made our appointment.

Is there something more we can do? The answer is emphatically, yes!

Our mental attitude must be *right*. That sounds like a lot of theoretical hooey, but the most successful salesmen in the business all say the same thing—"You've got to picture yourself making a sale under the best conditions possible." In other words, believe you're going to get that order. Believe that your prospect *needs* what you have to offer. One outstanding salesman says that every time he makes a call he visualizes his prospects down in the basement mad as hornets and struggling with worn out heating plants. He says it works wonders for him.

Then comes your approach. Get into your story

(*Continued on page* 66)



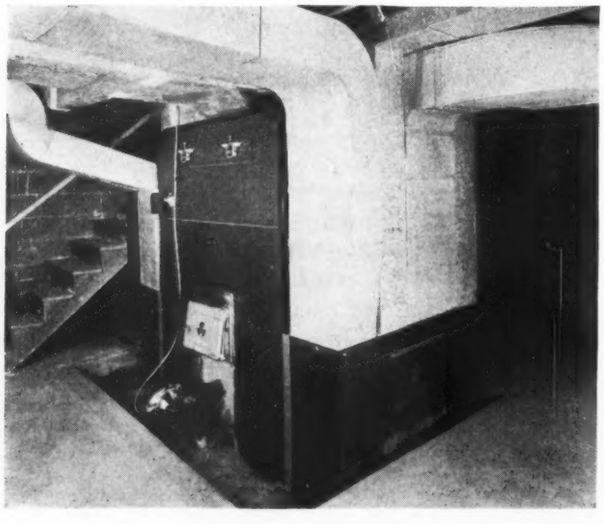
Winter Air Conditioning in A House With 244,000 Btu Loss

THE photographs and drawings accompanying this article show details of a large and unusual winter air conditioning installation made last summer by C. L. Epps, heating contractor, of Van Wert, Ohio. The house is the new home of the owner of one of Ohio's largest and best known peony farms, a short distance outside of Van Wert.

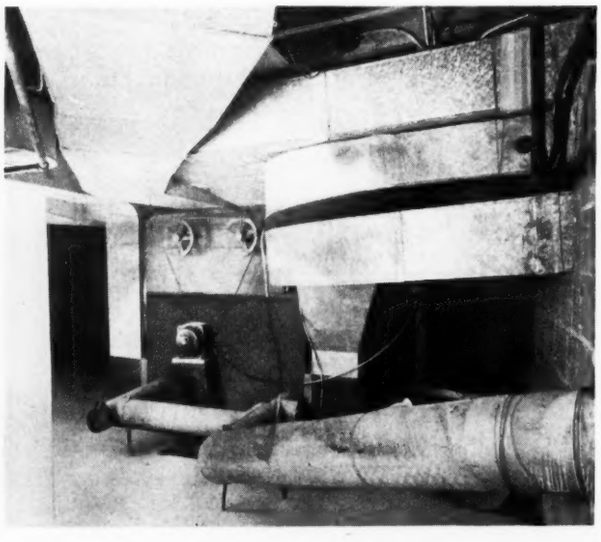
A part of the building (the present library, closets and rear entry back of the living room and dining room) was a house on the same site. The remainder of the structure is new, but matched to the old building through the use of suitable materials and architectural design.

The problem which confronted contractor Epps was to get through and into available space all the metal work required to heat so large a house, especially in view of the fact that there is no basement under the living room and garage wing, yet warm air had to be carried some 85 feet to the garage. As shown on the plans, the furnace is under the dining room and offset from the main trunk riser group, making necessary the very long run to the garage, plus a run of 35 feet to the rear of the servants' wing and another run of 35 feet to the front of the house.

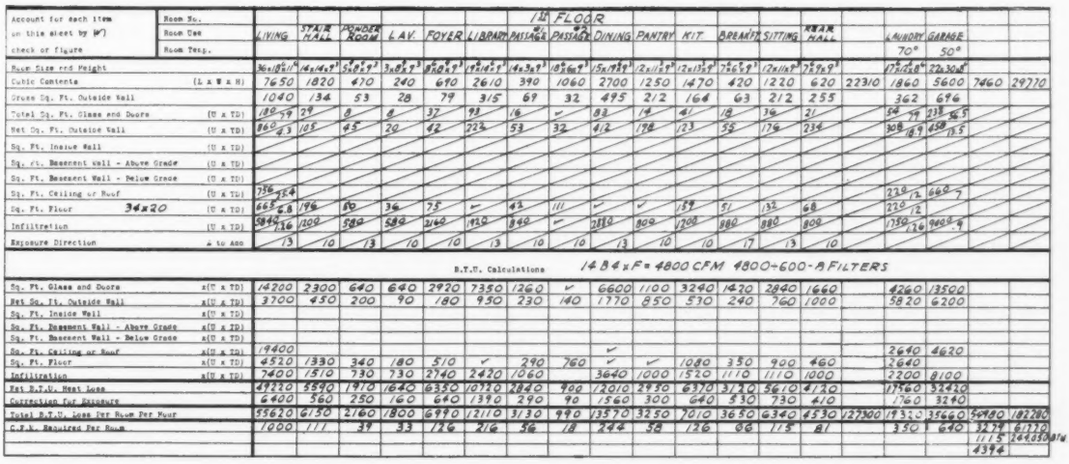
The furnace selected is an oil burning, Dailaire steel furnace with top mounted twin blowers having a



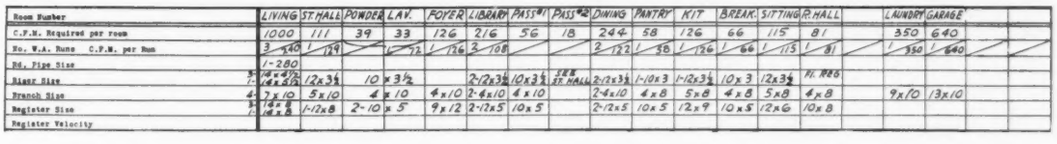
Front of the Dail, 250,000 Btu, oil burning (Wayne) furnace with one of returns in foreground. The furnace had to be pitted to get headroom. Above is exterior of front of house.



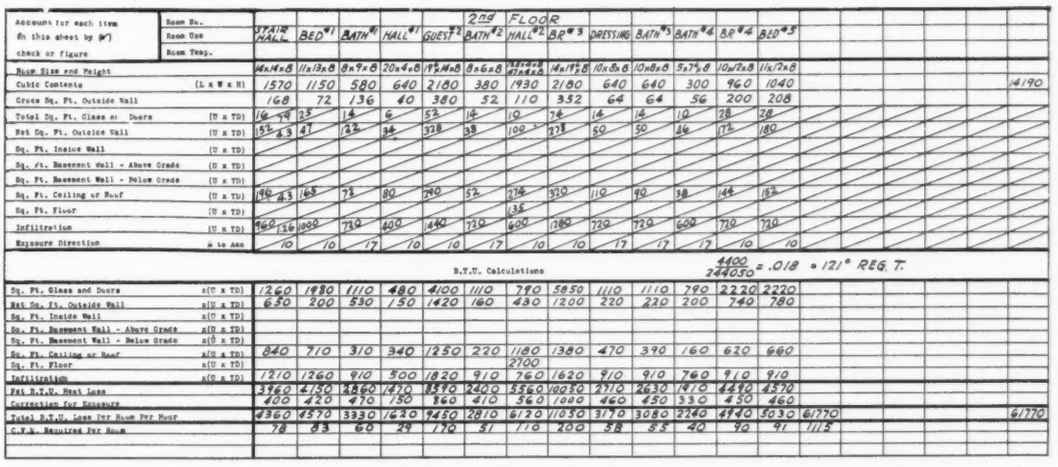
Rear of furnace showing twin, top blower mounting and motor, smoke pipe (down low) return and supply ducts from living room end of house.



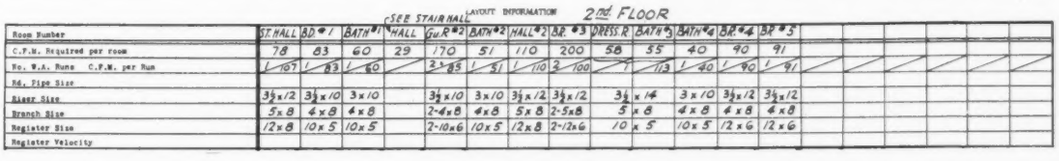
Account for each item on this sheet by (✓) check or figure	Room No. / Room Use / Room Temp.	LIVING	STAIR HALL	POWDER ROOM	LAV.	FOYER	LIBRARY	PASSAGE #1	PASSAGE #2	DINING	PANTRY	KIT	BREAKFT.	SITTING	REAR HALL		LAUNDRY 70°	GARAGE 50°		
Room Size and Height		36×18½×8'	14×14×9'	5'6"×3'×9'	3'×6'×7'	8'×8'×9'	12'×14'×9'	14×3×9'	10'×6'×9'	15'×13'×9'	12'×13'×9'	12'×13'×9'	7'6"×6'×9'	12'×11'×9'	7'6"×3'×9'		17'×16'×8'	22'×30'×8'		
Cubic Contents	(L x W x H)	7650	1820	470	240	690	2610	390	1060	2700	1250	1470	420	1220	620	22310	1860	5600	7460	29770
Gross Sq. Ft. Outside Wall		1040	134	53	28	79	315	69	32	495	212	164	63	212	255		362	696		
Total Sq. Ft. Glass and Doors	(U x TD)	130 59	29	8	8	37	93	16	✓	83	14	41	18	36	21		59	238 65		
Net Sq. Ft. Outside Wall	(U x TD)	860 43	105	45	20	42	222	53	32	412	198	123	55	176	234		303 189	458 115		
Sq. Ft. Inside Wall	(U x TD)																			
Sq. Ft. Basement Wall - Above Grade	(U x TD)																			
Sq. Ft. Basement Wall - Below Grade	(U x TD)																			
Sq. Ft. Ceiling or Roof	(U x TD)	736 384															220 12	660 7		
Sq. Ft. Floor 34x20	(U x TD)	665 68	196	80	36	75	✓	42	111	✓	✓	189	51	132	68		220 12			
Infiltration	(U x TD)	5845 136	1009	580	580	249	1930	849	✓	2850	809	1709	980	980	809		1750 126	9025 9		
Exposure Direction	⊾ to sec	13	10	13	10	10	13	10	10	13	10	10	17	13	10					
B.T.U. Calculations																				
Sq. Ft. Glass and Doors	x(U x TD)	14200	2300	640	640	2970	7350	1260	✓	6600	1100	3240	1470	2840	1660		4260	13500		
Net Sq. Ft. Outside Wall	x(U x TD)	3700	450	200	90	180	950	230	140	1770	850	530	240	760	1000		5820	6200		
Sq. Ft. Inside Wall	x(U x TD)																			
Sq. Ft. Basement Wall - Above Grade	x(U x TD)																			
Sq. Ft. Basement Wall - Below Grade	x(U x TD)																			
Sq. Ft. Ceiling or Roof	x(U x TD)	19400								✓							2640	4620		
Sq. Ft. Floor	x(U x TD)	4520	1330	340	180	510	✓	290	760	✓	✓	1080	350	900	460		2640			
Infiltration	x(U x TD)	7400	1510	730	730	2740	2420	1060		3640	1000	1520	1110	1110	1000		2200	8100		
Tot B.T.U. Heat Loss		49220	5590	1910	1640	6350	10720	2840	900	12010	2950	6370	3120	5610	4120		17460	32420		
Correction for Exposure		6400	560	250	160	640	1390	290	90	1560	300	640	530	730	410		1760	3240		
Total B.T.U. Loss Per Room Per Hour		55620	6150	2160	1800	6990	12110	3130	990	13570	3250	7010	3650	6340	4530	127300	19220	35660	54880	182280
C.F.M. Required Per Room		1000	111	39	33	126	216	56	18	244	58	126	66	115	81		350	640	3279	61770
																			115	244050 BTU
																			4394	



Room Number	LIVING	ST. HALL	POWDER	LAV.	FOYER	LIBRARY	PASS #1	PASS #2	DINING	PANTRY	KIT	BREAK.	SITTING	R. HALL		LAUNDRY	GARAGE		
C.F.M. Required per room	1000	111	39	33	126	216	56	18	244	58	126	66	115	81		350	640		
No. W.A. Runs C.F.M. per Run	3 340 / 1 149			1 72	1 126	2 108			2 122	1 58	1 126	1 66	1 115	1 81		1 350	1 640		
Rd. Pipe Size	1-280																		
Riser Size	3-14×4½ / 14×2½	12x3½	10 x 3½			2-12x3½	10x3½	SEE ST. HALL	2-12x3½	1-10x3	1-12x3½	10x3	12x3½	Wt. 1926					
Branch Size	4-7x10	5x10	4 x 10		4x10	2-4x10	4x10		2-4x10	4x8	5x8	4x8	5x8	4x8		9x10	13x10		
Register Size	3-14×8 / 14×8	1-12x8	2-10 x 5		9x12	2-12x5	10x5		2-12x5	10x5	12x9	10x8	12x6	10x8					
Register Velocity																			



Account for each item on this sheet by (✓) check or figure	Room No. / Room Use / Room Temp.	STAIR HALL	BED #1	BATH #1	HALL #1	GUEST #2	BATH #2	HALL #2	BR. #3	DRESSING	BATH #3	BATH #4	BR. #4	BED #5					
						2nd FLOOR													
Room Size and Height		46×14×8	11'×13'×8	8'×9'×8	20'×4'×8	9'×14'×8	8'×6'×8	Varies from 8'-0" to 8'-6"	14'×11'×8	10'×8'×8	10'×8'×8	5'7"×8	10'×12'×8	11'×12'×8					
Cubic Contents	(L x W x H)	1570	1150	580	640	2180	380	1930	2180	640	640	300	960	1040					14190
Gross Sq. Ft. Outside Wall		168	72	136	40	380	52	110	352	64	64	56	200	208					
Total Sq. Ft. Glass and Doors	(U x TD)	16 9	23	14	6	52	14	10	74	14	14	10	28	28					
Net Sq. Ft. Outside Wall	(U x TD)	152 43	47	122	34	328	38	100	278	50	50	46	172	180					
Sq. Ft. Inside Wall	(U x TD)																		
Sq. Ft. Basement Wall - Above Grade	(U x TD)																		
Sq. Ft. Basement Wall - Below Grade	(U x TD)																		
Sq. Ft. Ceiling or Roof	(U x TD)	196 43	165	72	80	240	52	214	330	110	90	38	144	162					
Sq. Ft. Floor	(U x TD)							135											
Infiltration	(U x TD)	960 126	1009	730	400	1640	730	600	1380	730	730	602	730	730					
Exposure Direction	⊾ to sec	10	10	17	10	10	17	10	10	17	17	17	17	10	10				
B.T.U. Calculations															4400 / 244050 = .018 = 121° REG. T.				
Sq. Ft. Glass and Doors	x(U x TD)	1260	1980	1110	480	4100	1110	790	5850	1110	1110	790	2220	2220					
Net Sq. Ft. Outside Wall	x(U x TD)	650	200	530	150	1420	160	430	1200	220	220	200	740	780					
Sq. Ft. Inside Wall	x(U x TD)																		
Sq. Ft. Basement Wall - Above Grade	x(U x TD)																		
Sq. Ft. Basement Wall - Below Grade	x(U x TD)																		
Sq. Ft. Ceiling or Roof	x(U x TD)	840	710	310	340	1250	220	1180 2700	1380	470	390	160	620	660					
Sq. Ft. Floor	x(U x TD)																		
Infiltration	x(U x TD)	1210	1260	910	500	1820	910	760	1620	910	910	760	910	910					
Tot B.T.U. Heat Loss		3960	4150	2860	1470	8590	2400	5560	10050	2710	2630	1910	4490	4570					
Correction for Exposure		400	420	470	130	860	410	560	1000	460	450	330	450	460					
Total B.T.U. Loss Per Room Per Hour		4360	4570	3330	1620	9450	2810	6120	11050	3170	3080	2240	4940	5030	61770				61770
C.F.M. Required Per Room		78	83	60	29	170	51	110	200	58	55	40	90	91	1115				



Room Number	ST. HALL	BD. #1	BATH #1	HALL	GUEST #2	BATH #2	HALL #2	BR. #3	DRESS. R.	BATH #3	BATH #4	BR. #4	BR. #5					
	SEE STAIR HALL LAYOUT INFORMATION				2nd FLOOR													
C.F.M. Required per room	78	83	60	29	170	51	110	200	58	55	40	90	91					
No. W.A. Runs C.F.M. per Run	1 107	1 83	1 60		2 85	1 51	1 110	2 100	1	1 113	1 40	1 90	1 91					
Rd. Pipe Size																		
Riser Size	3½x12	3½x10	3x10		3½x10	3x10	3½x12	3½x12	3½ x 14	3x10	3½x12	3½x12						
Branch Size	5x8	4x8	4x8		2-4x8	4x8	5x8	2-5x8	5 x 8	4x8	4x8	4x8						
Register Size	12x8	10x5	10x5		2-10x6	10x5	12x8	2-12x6	10 x 5	10x5	12x6	12x6						
Register Velocity																		

capacity of 250,000 Btu. The data sheet prepared by Dail engineers and reproduced here shows a total heat loss of 244,050 Btu and a cfm requirement of 3,279 at a register temperature of 121 degrees after correction for temperature drop through the long runs. It might be explained that the house is unusually well insulated. The walls throughout are filled with 4 inches of fill insulation. The roof is equally well insulated and storm sash are provided for all windows.

Data Sheet's Story

The data sheet reproduced tells most of the story of the design of the system. The system was designed for a temperature of 70 degrees or from 0 to 70 with allowances of from 10 to 17 per cent added for severe exposure. The cubage, areas of exposed surfaces and the heat loss factors used are shown and carried below for conversion into Btu calculations of all rooms.

This data sheet shows several things of interest. First—the unusual number of rooms having an exposed ceiling. Not only the rooms on the second floor, but the living room, laundry and garage on the first floor. Also these same first floor rooms have an exposed floor as have the rooms in the other wing (kitchen, sitting room, breakfast room, rear hall).

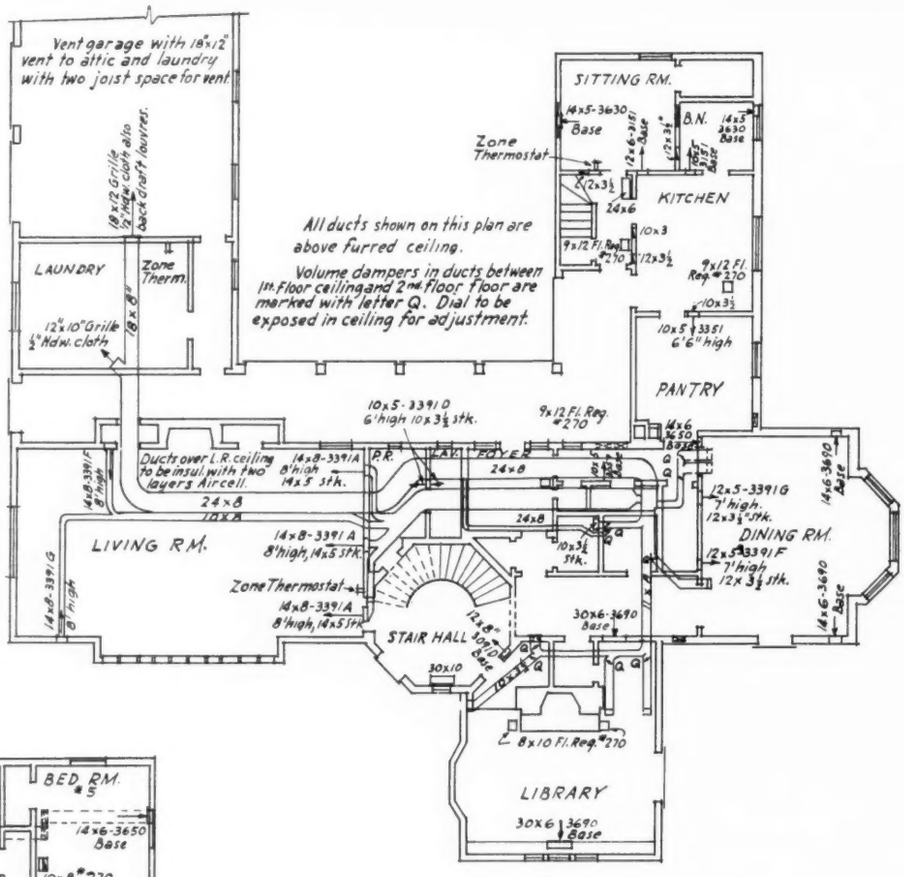
Living Room

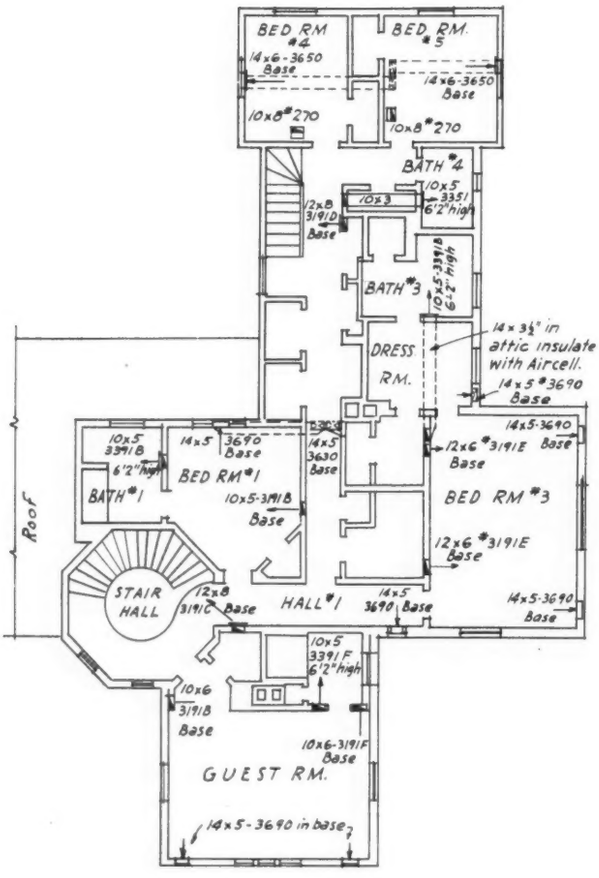
Living Room. This long room with two fully and one partially exposed wall has a concrete floor, no excavation beneath the floor, a semi-peaked roof, unusually large window areas. This large room with a heat loss of more than 55,000 Btu is heated with five registers (three in the inside end wall and one each on the side walls toward the outside end) with all registers placed 8 feet above the floor. All registers in the room served by drops from a small trunk passing

At right—First floor plan showing distribution zones, trunks above living room ceiling, furred in trunks through hall, and locations of registers and returns. Attention is called to the damper note on the plan.

◆

Second floor plan showing supply and return from all major rooms. The plan explains the high heat loss of the first floor rooms — because the first floor has no warm areas above or any warm basement below.





above the living room ceiling and turning down through the wall.

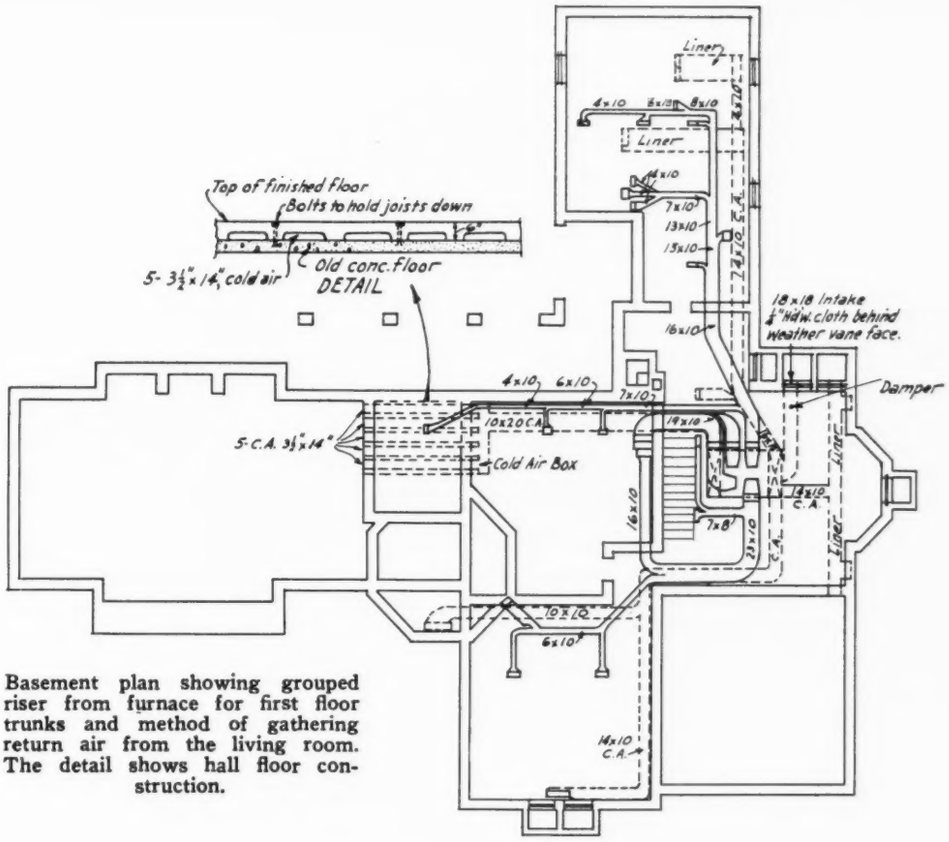
To get air out of the living room it was first planned to locate two large returns in the floor beneath the long side wall window and another return in each outside wall corner. But instead the living room floor was brought up to the level of other first floor rooms by bolting down joists into the concrete and the joists were cut out as shown on the plan. Then all returns were located on the inside end wall as shown, using five 3½ by 14-inch wall stacks laid through the joist spaces and gathered into a cold air box shown.

First Floor Trunks

First Floor Trunk. Because there was no space to carry the long trunk to the garage underneath the first floor, it was necessary to run this duct above the ceiling of the first floor rooms. This trunk is fed from one of the risers coming up from the furnace. The ceilings of the powder room, lavatory, foyer, and passage were furred down to conceal the duct and after the sections were placed, a new ceiling on metal lath was erected. This trunk continues across the living room ceiling in the peak of the roof and turns across the passage, laundry and opens into the garage. The trunk above the ceiling is insulated with two layers of air cell paper.

Basement Piping

Trunks from Furnace. It will be noted by comparing the basement and first floor plans that the furnace bonnet is not below the risers which bring air from the furnace to the trunks which run through the first floor rooms. Examination of the basement plan shows that the trunk to the servants' quarters comes off the top of the bonnet and goes back beneath the first floor rooms through a space excavated to carry the duct.



Basement plan showing grouped riser from furnace for first floor trunks and method of gathering return air from the living room. The detail shows hall floor construction.

The registers served on the first and second floors are baseboard, side wall and floor types.

Three large trunks off the bonnet make a loop around the furnace room and come together below the serving room. The grouped ducts pass up through this room to the ceiling and then spread to the front and central areas of the house.

Fabrication and Erection

Erection. Contractor Epps states that practically all the duct work was made up from the blue prints before the house was far enough along to erect metal work. When it came time to erect the ducts it was found that because of twists and turns and structural members, erection could not be made and about half of the fittings had to be scrapped and new sections made up from measurements taken as the partitions were erected. As can be appreciated from the plans, most of the concealed fittings had to be fabricated as very small units in order to get sections into position.

Control Operation

Control. The house is divided into four zones for control purposes. The garage and laundry, which are served by one trunk, have one thermostat. The living room is a zone by itself. The guest bedroom and bath, master bedroom and bath and dressing room, bedroom number 3 and bath, library, dining room and lower hall are one zone. All first and second floor rooms in the servants' wing (also served from one trunk) have a thermostat on the second floor. The main rooms of the house on both first and second floors served by two trunks, have a thermostat located in the living room.

All thermostats are connected in parallel to the oil burner which is a Wayne with a 3½ gallon tip. Whenever any one or more thermostats calls for heat, the burner starts. When bonnet temperature builds up to 165 degrees, the blower starts and will run until bonnet air temperatures drop to 140 degrees. A limit control is placed in the bonnet and set for 200 degrees. Should bonnet temperatures reach 200 degrees, the burner will stop and continue in the standby position until bonnet temperatures again drop below the 200 degree setting.

Operating Results

Operation. When information for this article was submitted by Mr. Epps, very little severe weather had been available for balancing the heat delivery. Because of the number of rooms served by two of the three thermostats and because these rooms are on two floors with varying exposure and heat loss, a considerable amount of balancing will be required. The system has been balanced as nearly as possible for designed air delivery from all registers, but final balance will have to be made for room temperature.

It might be mentioned that all branches have balancing dampers. In branches concealed behind furred ceilings, the damper quadrants were left exposed in the ceiling so that final adjustment can be made without disturbing interior decoration.

Forced Air Heating Facts From the Research Residence

By S. Konzo

Special Research Associate
Engineering Experiment Station
University of Illinois

These discussions of some of the different methods of designing duct systems are for the purpose of presenting the essential details of each, and to compare their respective advantages and disadvantages. No attempt has been made to "recommend" any one method in preference to another. A study of these various methods should indicate those which may be considered as suitable for a given type of installation.

IN the two preceding articles, the procedure to be used in the design of duct systems by the "Velocity method" was discussed in detail. In the last issue the method using standardized duct sizes was presented and some of the advantages and disadvantages of the method were outlined. For the sake of simplicity all of these discussions have been confined to the individual duct systems. However, the principles applicable to the individual duct system are equally applicable to trunk duct systems as will be shown later.

In this issue the design of duct systems by the "Equal friction loss method" will be presented in detail. The elements of design, including the advantages and disadvantages of the method will be considered.

B. Equal Friction Loss Method

In the "Velocity method" for designing duct systems, which has been considered previously, the air velocities in the various portions of the duct system are determined first and the duct sizes are usually based on these velocities. The total pressure loss in the ducts is determined after the ducts have been sized.

However, in the case of the "equal friction loss" method the procedure is reversed, since the pressure loss per unit of length is determined first and the duct velocities are determined only after the duct sizes have been selected. The method is discussed in detail since it, or some modification of it, forms the basis of many design systems now in use. In order to show the method more clearly, the following outline of procedure is presented:

Procedure in Design for:
B. Equal friction loss method.
1. Individual duct system.

1. In Fig. 1 it is assumed that four rooms, indicated by *a, b, c,* and *d* are to be supplied by warm air from the furnace *F*. The method of determining the air volumes required for each room has been discussed in a previous article and hence will not be presented here. The locations of the warm-air registers for each room are as indicated in Fig. 1.

Since examples showing numerical values will be more readily understood, it is assumed that the air volume requirements for rooms *a, b, c,* and *d* are 200, 400, 150, and 300 cu. ft. per minute, respectively. These values are listed in column (2) of Table 1.

2. Indicate the duct connection from the warm-air registers to the casing of the furnace. In Fig. 1 these ducts are indicated by the letters *a, b, c,* and *d*. Determine the equivalent length in feet of each duct, assuming that each right angle turn is equivalent to approximately 10 diameters of the pipe. Since the duct diameter is as yet undetermined, an approximation must be made in the equivalent length of the duct.

In the numerical example it is assumed that the equivalent lengths are 20, 40, 50, and 20 feet for ducts *a, b, c,* and *d,* respectively. See column (3) in Table 1.

3. It may be noted that duct *c* is the longest, and hence the preliminary calculations will be based on this single duct alone. After the size of this duct and the pressure loss have been determined, as shown in the first part of Table 1, then and only then is any attempt made to determine the sizes of the other ducts in the system.

Assume some value of the friction loss per 100 ft. of duct which is to be used in the calculations of the size of duct (*c*). In the example shown the value of 0.08 in. per 100 ft. of duct was selected, as shown in column (4) of Table 1. This choice of the value of

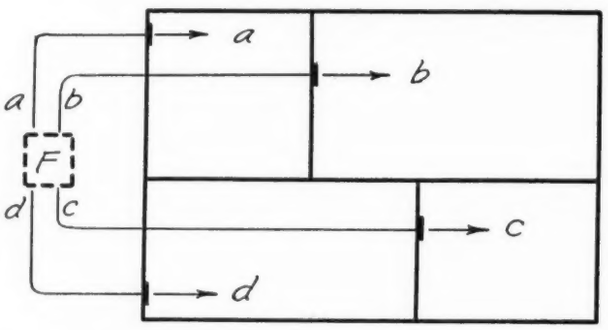


Fig. 1—Simplified line diagram showing an individual duct system. (See text for method of calculating dust sizes.)

TABLE 1
Typical Example of Calculation Procedure
B. Equal friction loss method. 1. Individual ducts

First Step

1	2	3	4	5	6		7		8	9
Room	C.F.M.	Equivalent Length, Feet	Assumed Friction Loss for 100 Ft., Inches	Equivalent Round Duct Diameter, Inches	Rectangular Duct, Inches		Duct Area		Duct Velocity, F.P.M.	Total Duct Loss, Inches
					Depth	Width	Sq. In.	Sq. Ft.		
a	200	20	.....	.....	.....	.....	.....	.....	.....	0.040
b	400	40	.....	.....	.....	.....	.....	.....	.....	0.040
c	150	50	0.08	7.5	8	5.8	46.4	0.32	469	0.040
d	300	20	.....	.....	.....	.....	.....	.....	.....	0.040

Second Step

1	2	3	4	4a	5	6		7		8
Room	C.F.M.	Equivalent Length, Feet	Actual Friction Loss, Inches	Friction Loss for 100 Ft., Inches	Equivalent Round Duct Diameter	Duct Size, Inches		Duct Area		Duct Air Velocity, F.P.M.
						Depth	Width	Sq. In.	Sq. Ft.	
a	200	20	0.040	0.200	6.9	8	5.0	40.0	0.28	715
b	400	40	0.040	0.100	10.4	8	11.3	90.4	0.63	635
d	300	20	0.040	0.200	8.2	8	6.9	55.2	0.38	790

the friction loss per 100 ft. of duct is quite arbitrary and hence for that reason may be somewhat confusing to that designer, who has not learned by experience some of the limitations that govern the selection of a suitable value. In other words, why should one select 0.08 for this value instead of 0.20 or 0.02? In this example the choice of 0.08 is more defensible than either of the other two values listed. Briefly stated, the argument is this:

A duct having an equivalent length of 50 feet and a friction loss of 0.08 in. per 100 ft. will have a pressure loss amounting to one-half of 0.08 in. or 0.04 in. A loss of similar magnitude would probably be obtained for the return duct system, or a total for the entire duct system alone of 0.08 in. The addition of approximately 0.05 in. for the loss through the casing, another

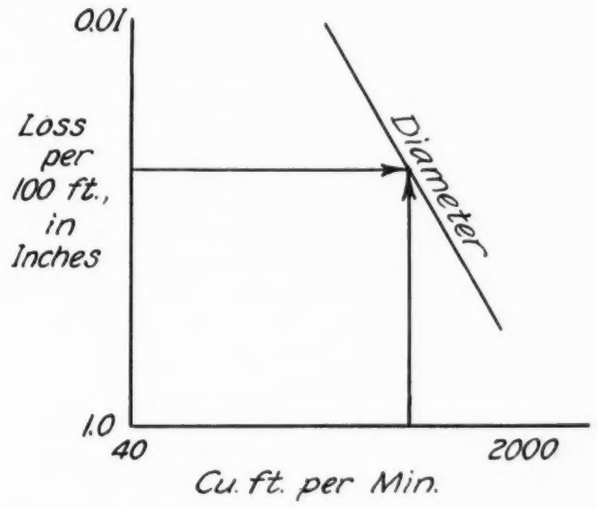


Fig. 2—Skeleton diagram of friction chart showing determination of pipe diameter.

of 0.08 in. for loss through filters, and a loss of 0.07 in. through the registers and grilles comprise a total loss of 0.28 in. It is possible to obtain fans to deliver air against this pressure head. If, however, a value of 0.20 in. for the friction loss per 100 ft. of duct had been selected, the total pressure loss would have been approximately 0.40 in., which is greater than is desirable for small installations. On the other hand, if a value of 0.02 in. for the friction loss per 100 ft. of duct had been selected, the duct sizes would have been excessively large and the air velocities in the duct would have been quite low.

4. With this value of the friction loss of 0.08 in. per 100 ft. of duct, together with the air volume handled by duct (*c*), the equivalent round duct diameter can be determined from the ordinary friction chart. Fig. 2 shows a simplified skeleton diagram of the friction chart, and shows how the duct diameter may be determined when the air volume and the friction loss per 100 ft. of duct are both known. Fig. 3 shows the ordinary friction chart in more complete form.

In the numerical example, the ordinates for 150 cfm and 0.08 in. intersect at 7.5 in. diameter. This value is listed in column (5) of Table 1.

5. From the tables or charts showing the circular equivalents of rectangular ducts, determine the size of the rectangular ducts. See column (6) of Table 1. The duct area is given in column (7).

6. The air velocity in the duct is determined by dividing the value for air quantity by the value representing the duct area. It should be noted that up to this point in the design, no reference has been made to air velocities. In fact, the main disadvantage inherent in the method designated as the "equal friction loss method" is that the air velocities can not be predetermined. In some cases if the resulting air velocities should be either too large or too small, the calculations

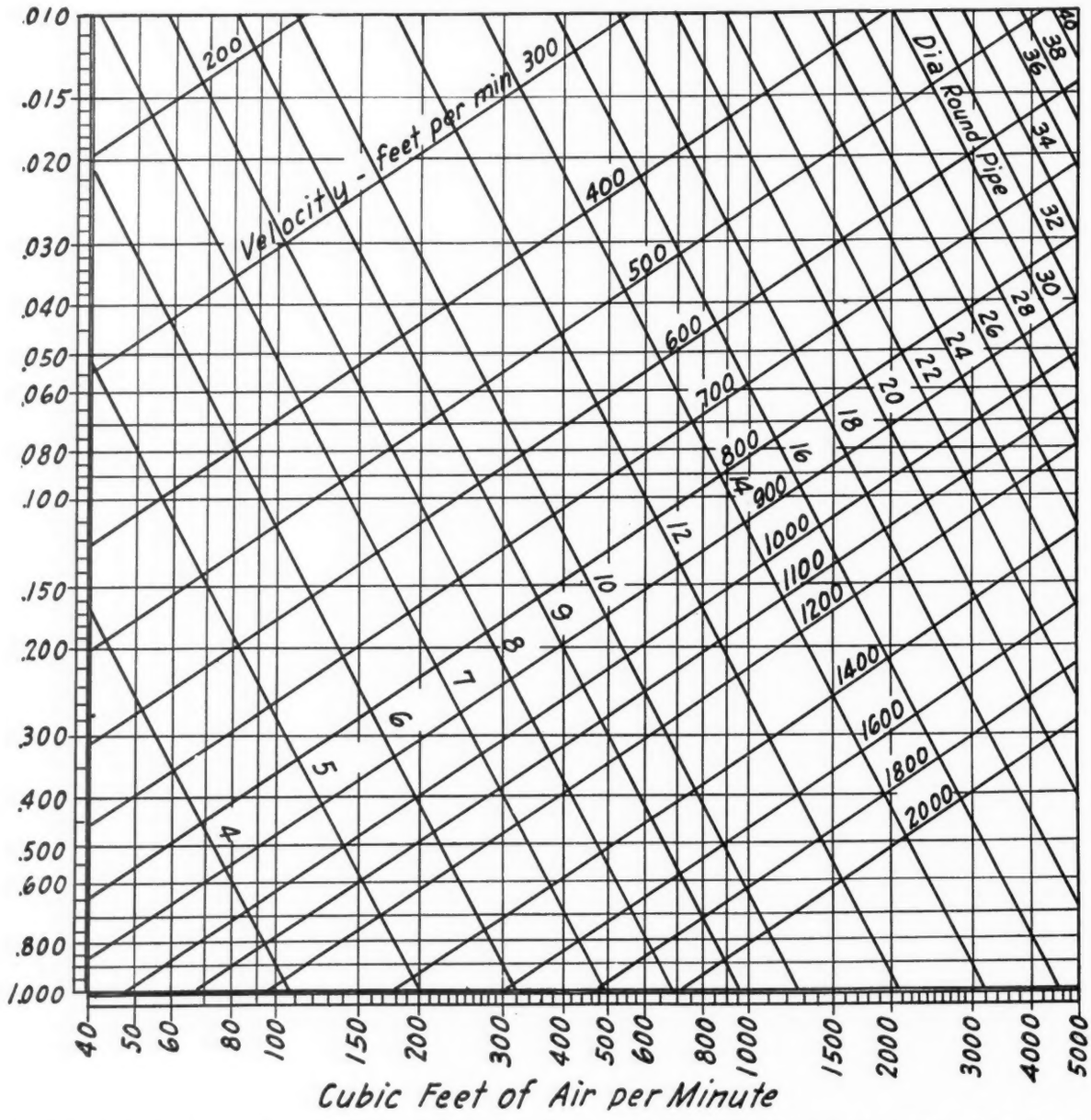


Fig. 3—Revised Friction Chart, originated and copyrighted by G. A. Voorhees, with special provision for low cfm and low pressure losses in small pipes.

will have to be re-made with suitable modifications made in the assumed value for the friction loss per 100 ft. of duct.

It is in this single feature that the method designated as the "Velocity method" is superior to the method designated as the "Equal friction loss method."

In fact, it seems rather futile to specify recommended values for air velocities in ducts, stacks, and fittings for the latter method. About all that can be specified is the *maximum* allowable velocities in the various parts of the system.

In the numerical example the duct velocity listed in column (8) is 469 ft. per min. If, for any reason, a larger duct velocity is desired, the value of the assumed friction loss for duct (*c*) would have to be larger than 0.08 in.

7. The total pressure loss for duct (*c*) is listed in column (9). It is obtained by substituting proper values in the equation:

$$\text{Total pressure loss, inches} = \text{(Loss per (100 ft.))} \times \frac{\text{Equivalent length in ft.}}{100}$$

The procedure up to this point has been designated as the first step in Table 1. The second step consists in assuming that *the total pressure loss in each of the ducts, a, b, and d is exactly equal in magnitude to that for duct (c).* In the numerical example the *total* pressure loss in each of the separate ducts has been regarded as equal to 0.04 inches.

8. Since the lengths of the ducts *a, b,* and *d,* are not the same as duct *c,* the values for the friction loss per 100 ft. of duct are not the same. In the case of duct *a,* for example, if the total pressure loss is 0.04 in. for a length of 20 ft., then the friction loss for 100 ft. of duct will be 5 times 0.04 in. or 0.20 in. That is:

$$\text{Loss/100 ft} = \text{(Totl. Pres. Loss, in.)} \times \frac{100}{\text{Equiv. Length, ft.}}$$

TABLE 2

Typical Example of Calculation Procedure
B. Equal friction loss method. 2. Total friction loss predetermined

Room	C.F.M.	Equivalent Length, Feet	Total Friction Loss, Inches	Friction Loss for 100 Ft., Inches	Equivalent Round Duct, Diameter	Duct Size, Inches		Duct Area		Duct Air Velocity, F.P.M.
						Depth	Width	Sq. Ft.	Sq. In.	
a	200	20	0.05	0.250	6.8	8	4.8	38.4	0.27	740
b	400	40	0.05	0.125	9.9	8	10.3	82.4	0.57	702
c	150	50	0.05	0.100	7.2	8	5.4	43.2	0.30	500
d	300	20	0.05	0.250	7.7	8	6.1	48.8	0.34	883

These calculations were based on the assumption that the total friction loss in the ducts (Column 4) was equal to 0.05 in. However, the method is applicable for any other value of the total friction loss.

In a similar manner the values for the friction loss per 100 ft. of duct are determined for each of the ducts *b* and *d*. See values in column (4a) in Table 1.

9. From this point the calculation procedure for ducts *a*, *b*, and *d* is exactly the same as that outlined for duct *c*. With the aid of the friction chart and the known values for cfm and friction loss per 100 ft. of duct, the equivalent round duct diameter is selected. See Figs. 2 and 3. The rectangular duct size is then determined, from which finally the duct velocities can be determined. As explained previously, if the duct velocities are considered excessive, modifications must be made in the duct sizes.

For example, if for duct (*d*) the duct velocity of 790 ft. per minute was considered as excessive, the duct size could be enlarged a bit. This would be equivalent to reducing the total friction loss of that duct. The difference in the friction loss would be compensated for by means of a damper in the duct.

Advantages of Method B-1

The advantages of this method of design may be itemized as follows:

1. The chief merit of the method of design which is designated as the "equal friction loss" method is that the determination of the pressure loss of any given duct is fairly simple. Since the duct sizes are based on the assumption of a constant friction loss per unit of length, the total loss is obtained by multiplying the loss per unit of length by the length of the duct.

2. The duct sizes, as determined, should require a minimum of damper adjustment, since each of the ducts is designed for equal total friction loss. The material for fabricating the ducts is, therefore, used economically.

Disadvantages of Method B-1

The disadvantages of this method of design may be summarized as follows:

1. As explained previously, the main difficulty with this method of design is that the determination of the duct velocities is considered as a secondary matter. In fact, considerable variations may exist in the duct velocities in the various parts of the duct system.

It should be emphasized that in every case the calculations should be carried forward to the point where the duct velocities have been determined. Otherwise, the calculated sizes of exceedingly short ducts may be so small that the duct air velocities are excessively high. For example, if duct (*d*) in the numerical example was only 5 ft. in length instead of 20 ft., the required friction loss per 100 ft. would be 0.8 in.; the equivalent round duct would be 6.2 in.; the rectangular duct size would be 4 in. x 8 in.; the duct area would be 0.222 sq. ft.; and the duct air velocity would be 1350 ft. per min.

In a case of this sort it would be better practice to arbitrarily increase the duct size, in order to decrease the average velocity, and rely on the frictional effect of dampers to introduce the necessary resistance.

2. The method is not as amenable to standardization in duct sizes as are the velocity methods which have been described previously.

Duct Design for "Packaged Units"

During the first few years of the rapid development of the forced-air heating systems, the installer was

(*Continued on page* 68)

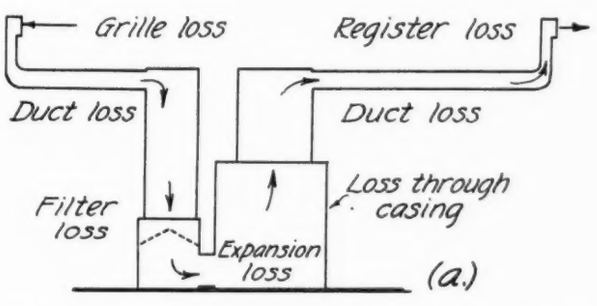


Fig. 4A—Estimation of internal and external losses is required.

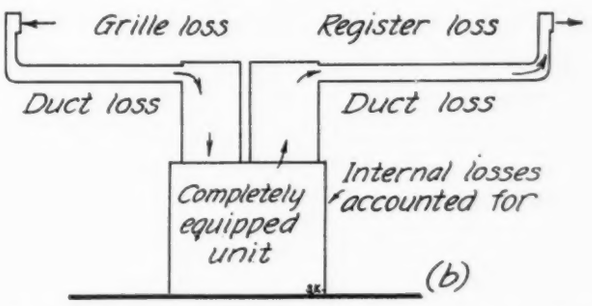


Fig. 4B—Estimation of only external losses is required where proper performance data are given.

A Chart Method For Locating Splitters in Elbows

By R. D. Madison
Buffalo Forge Co.

THE purpose of this article is to summarize the data in "Pressure Losses in Rectangular Elbows" by Madison and Parker which appeared in the September to November issues of the American Artisan and to offer further observations on the applications of these data to the designer of duct systems. While it is generally well known that long radius elbows are of the "low loss" type it is not so well known that elbows of shorter radius with the aid of one or two simple splitters can often be made equal to them or better in performance.

Although the use of the term "radius ratio" has been generally adopted for designating the degree of abruptness of bend in 90 degree elbows, the authors have sought to introduce a new term to simplify elbow calculations. Formerly, if the centerline radius (average of the inside and outside radii) was divided by the width of the duct in the plane of the bend the radius ratio would be obtained. The author's curves have been plotted upon "curve ratio" a term used to mean the inside radius divided by the outside radius. Since both radii are known, the value of curve ratio is easily obtained.

Charted Resistances

In the original paper, a method of finding the elbow loss with various numbers of splitters was given. To simplify this solution and at the same time give a visible indication of the number of splitters desirable, Fig. 1 has been prepared. While the curves are strictly for elbows of square cross-section, they may be used for other cross sections approximating these dimensions.

Assume we have an elbow with an inside radius of 2 inches and an outside radius of 20 inches—the curve ratio $= 2 \div 20 = .1$. Referring to Fig. 1 for a curve ratio of .1 an elbow with no splitters will have a loss of 60 per cent of the velocity pressure in it.

Editor's Note—Since velocity pressure or velocity head is frequently misunderstood and because its explanation is so essential to an understanding of the data presented by the author, we add an explanation used by S. Konzo and his table of relationships between air velocity and pressure loss. The explanation will be found at the end of this article.

If this same elbow were to have one splitter, the loss would be 22 per cent as indicated by the curve in Fig. 1. Whether two or three splitters were to be used in this elbow would depend partly upon how important it was to reduce the loss to a minimum. Seldom would it be necessary to use more than three and if the curve ratio of the original elbow is large, less might be even better than more, as indicated by the crossing of the curves.

In the original article a chart[1] was given for the suggested ideal location for splitters in elbows. Further study of the law upon which this chart is based suggests a simpler and more direct method of obtaining this same data. Such a revised chart is shown in Fig. 2. Here the scale at the left represents the actual inside radius of an elbow while that on the right, the outside radius. By laying a straight edge or triangle across these two points the intersections with the vertical scales between them locate the radii to be used for one, two or three splitters depending upon the number used. All scales are graduated alike.

To Find Splitter Radii

Thus, as indicated in the example, if an elbow has an inside radius of 2 inches and an outside radius of 20 inches and there are to be two splitters, connect these two points with a straight line. Where this line crosses the vertical one marked No. 1 of 2, read 4¼ inches, the radius of the smaller splitter, and where it crosses the line marked No. 2 of 2, read 9¼ inches, the radius of the larger splitter. If three splitters were to be used the corresponding radii can be read directly from the intersection with the three scales marked No. 1 of 3, No. 2 of 3 and No. 3 of 3. The radius of the center splitter is exactly the same as if only one were used.

While it is generally well known that 1½ center line radius elbows (elbows having a center line radius 1½ times the width of the duct) are of low loss type, it is frequently found that due to cost of fabrication or expediency on the job inferior elbow construction is used. The first important thing to keep in mind is that if one has to "cut corners" it should be on the shorter runs. The longest ducts should be favored by lowering the frictional resistance in them so that the equivalent of a shorter system may be obtained. This may be done by proportioning the size of duct to lower the velocity in it the farther it carries the air. All elbows in these longer runs should be of the low loss type. If the center line radius cannot be made as large as 1½ times the duct width, splitters may be used as previously explained.

[1]Reproduced from Fan Engineering—Third Edition, 1933. Buffalo Forge Company.

(*Continued on page* 74)

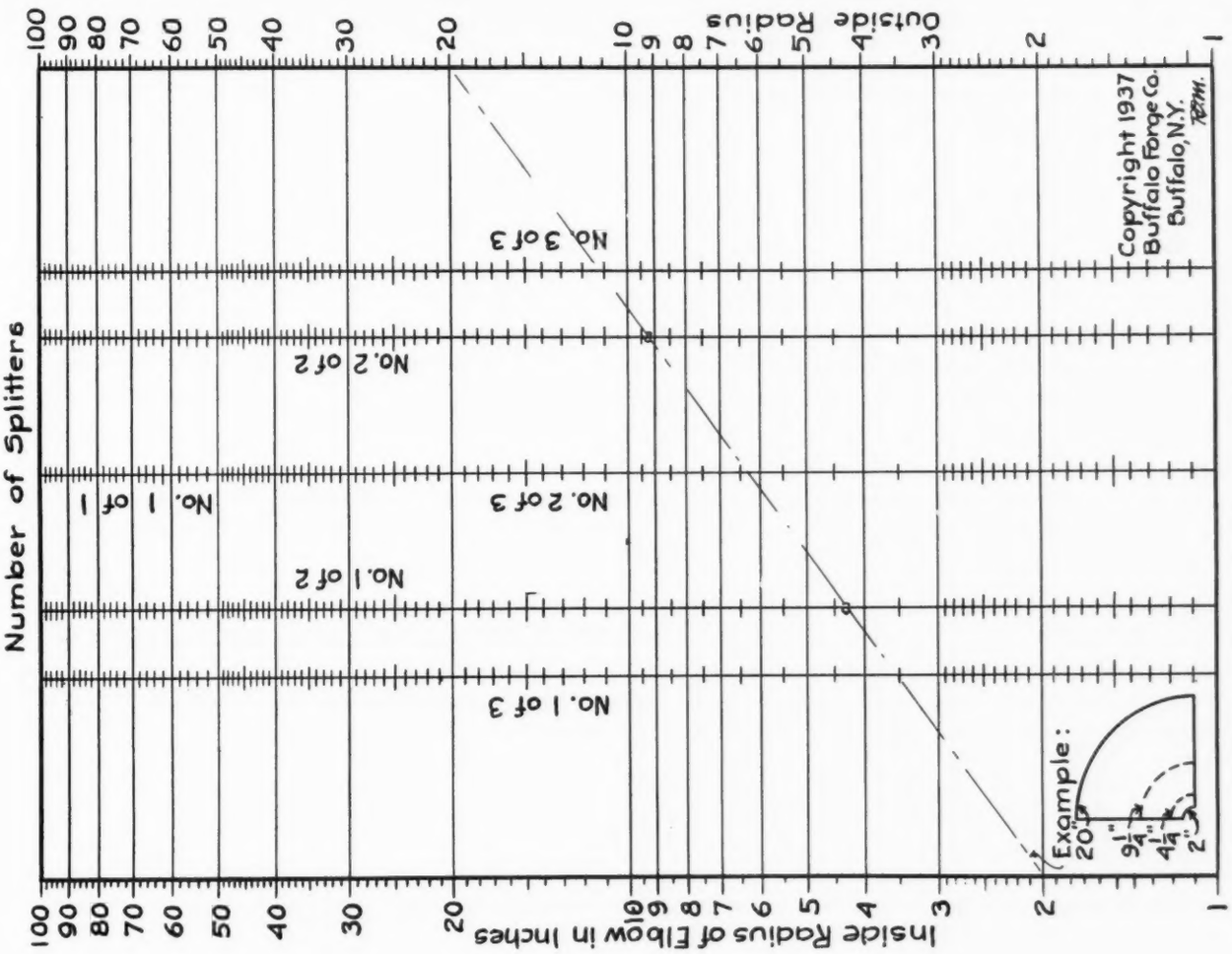


Fig. 2.—Chart Giving Location of Elbow Splitters.

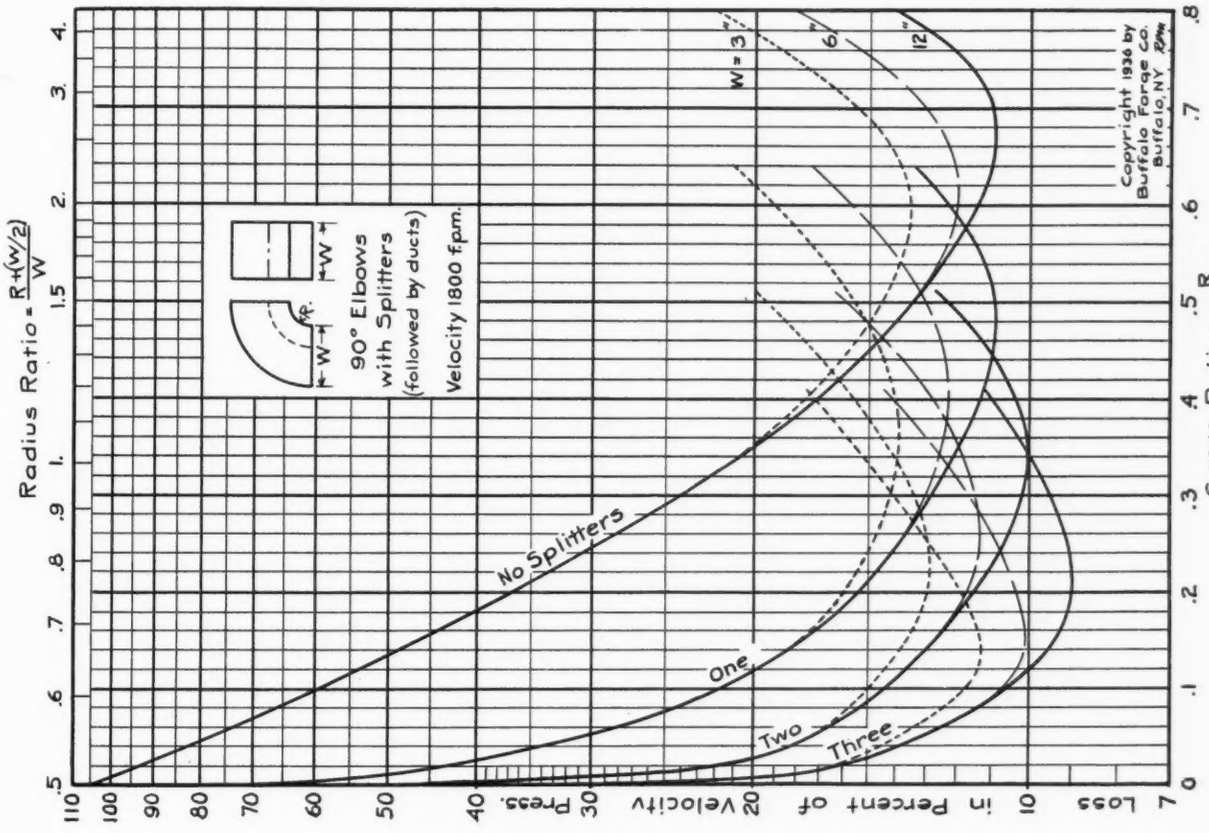


Fig. 1.—Pressure Loss in Elbows with Splitters.

Humidity in House Heating* [Part 3]

Humidifiers for Radiant Equipment

THE satisfactory humidification of air with heating equipment of this general type where there is no concentration of air circulation is not so simple a proposition as with circulating equipment, except where stoves only are used, in which case kettles kept filled with water are usually sufficient.

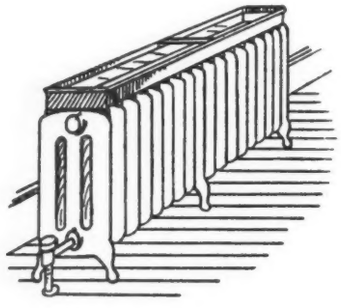
The usual type of air moistener is a long shallow pan of sheet copper or galvanized iron placed on top of the radiator (Figure 8). These pans may be obtained in various sizes and are frequently concealed in radiator covers. As the radiator temperatures under normal conditions, particularly of hot water radiators are comparatively low the rate of evaporation from these pans is correspondingly low. This is partially remedied in some types by the use of absorbent wick placed on grids or supports to increase the evaporating surface as in Figure 6.

Other types of water pans are designed to hang behind the radiators or to be placed between the coils.

Humidifiers for Either Air-circulating or Radiant Equipment

Several humidifiers are now on the market which make use of a retort or vaporizer placed in the fire-box of the boiler or furnace. This is connected to the water service and the quantity of water which is vaporized is determined first by a valve adjusting the flow of water, and second by the intensity of the fire—being thus semi-automatic in action. The water so vaporized is distributed throughout the house by means of well insulated pipes leading to one, two or more outlets in the halls and principal rooms. These outlets are placed at points, either in or near the principal radiators, where there will be the minimum condensation by chilling draughts. In the case of hot air equipment the vapor from the retort may be conducted directly into the air circulation in the furnace jacket or cap.

The component parts of equpiment of this kind are indicated in, Figure 9. While complete equipment ready for installation is on the market, any one can



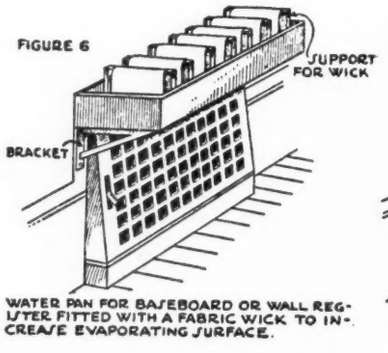
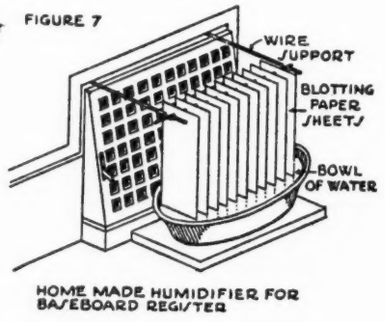


FIGURE 6
SUPPORT FOR WICK
BRACKET
WATER PAN FOR BASEBOARD OR WALL REGISTER FITTED WITH A FABRIC WICK TO INCREASE EVAPORATING SURFACE.



Left—Fig. 8—A common type of pan placed on a radiator but because of low temperatures incapable of evaporating sufficient water. Center—Fig. 6 and right Fig 7—Application of supplementary evaporating wicks to increase moisture evaporation. Much better results are obtained with evaporators in the furnace bonnet.

As the free water surface of such pans is necessarily restricted in area, wicks are used to increase the evaporating surface. When such wick is a towel large enough to almost cover the back of the radiator appreciable quantities of water are evaporated.

Water pans for use on radiators are all supplied with water by hand. The radiators to be so equipped are those which are in most constant use, and the number is determined by results in humidification as measured by the hygrometer.

With steam heating equipment a special valve designed for the purpose may be attached to the radiator for the continuous liberation of a small quantity of steam into the room. Care should be taken to see that the steam so liberated is deflected away from the walls and is not in sufficient quantity to cause a drip on the floor.

make up the necessary parts from odd pieces of pipe and standard pipe connections and valves.

Another type adaptable to either furnace or boiler equipment makes use of the waste heat of the smoke pipe for the evaporation of water, the vapor being distributed as in the retort type (Figure 10). A water jacket encircles a pipe which is substituted for a section of the regular smoke pipe, the water being maintained at a predetermined level by means of a float-box connected with the water service.

Independently Operated Humidifiers

Humidifiers or air moisteners designed to operate independently of the heating equipment are available.

Many of these humidifiers are electrically operated, and being portable, may be used in any room in which electric current is available.

One is the atomizer type. This device discharges a very fine spray of water vapor into the room from a

*A booklet by the same name, published by the Resources Intelligence Service, Department of the Interior, Canada, and distributed by The Dominion Fuel Board. Five cents per copy. Reprinted by permission.

jet in much the same manner as an ordinary nasal atomizer. A small electric motor drives an air compressor to furnish the air pressure for its operation. The spray must be so fine that it will be quickly and thoroughly evaporated. Another type creates a spray by centrifugal force. A small electric motor revolves a disk at high speed. The water flows onto the disk and is thrown against a series of stationary blades surrounding the circumference of the disk, forming a fine spray which is forced out into the room where it is quickly evaporated. Still another type uses an electric fan to pass a current of air over a slowly moving surface consisting of a fabric belt which is kept wet by passing through a water reservoir. Humidifiers of this general type employ the heat of the air obtained from the heating equipment for the evaporation of the water, the only current required being that necessary to operate a small motor. In others the water is evaporated by means of a heating element placed in the water container. The same results may be obtained by using a small electric plate or grill to evaporate water from a kettle (Figure 11). Care should be taken to use insulating mats to protect the stands upon which electric humidifiers of this type are placed and to use switches that will automatically cut off the current when the water container becomes dry. It should be pointed out, however, that the evaporation of water by electricity, as in these devices, is more expensive than by the househeating plant, even with the most favorable rates for current.

With few exceptions small portable electric humidifiers are kept supplied with water by hand.

Another type of humidifier utilizes a spray of water from the water service (Figure 12). This fine spray from a specially designed nozzle is directed vertically downward in a long box placed vertically on the wall, or built into it. The box has openings into the room on one side near each end. The fine spray induces a circulation of air through the box; the air, which enters at the upper opening and leaves at the lower, being moistened and washed as it passes through the spray. The excess water is collected at the lower end of the box and drained away.

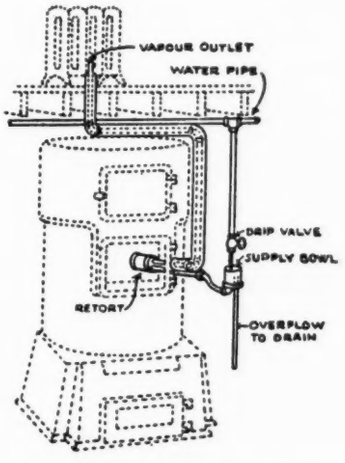
General Remarks

The foregoing is only a general indication of the types of humidifiers that are now available. Many new types are being developed and placed on the market.

Many householders may be impressed with the desirability and necessity of securing relief from the present dry air conditions in their houses, but only to the extent that that relief can be obtained with humidification equipment of a simple type requiring no attention involving the apparent inconvenience and difficulty of using a hygrometer.

To these hourseholders it might be emphasized that even a partial relief from dry air conditions is of considerable value in the maintenance of health and the preservation of house and furnishings.

Moreover, it might be again pointed out that humidifiers operated in conjunction with the heating equipment, if of adequate capacity to serve under average heating conditions, require practically no attention except that of maintaining the water supply and of an occasional cleaning—the hot fires required in severe weather evaporating the larger quantities of water then required for ample humidification. Thus the number of water pans installed on the radiators of a house heated by steam or hot water, having the evaporating capacity to give healthful humidification in average winter weather, will, for all practical purposes, give adequate relief from dry air conditions throughout the whole heating season—similarly with the water pans on hot- or warm-air furnaces and with other humidifiers of the same general class.



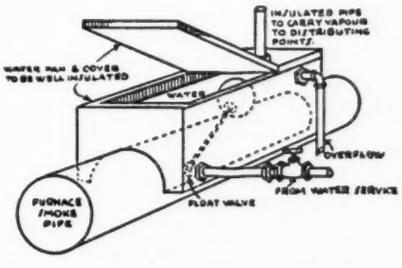
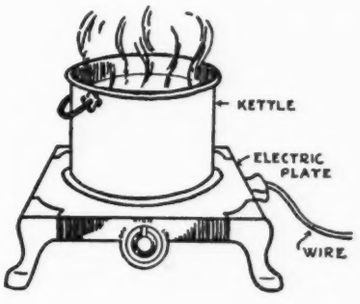


Fig. 10—Smoke type evaporator of early type—recently improved.



Above—Fig. 9—Apparatus to vaporize water in a boiler and conduct humidified air into room. Operates only with a hot fire. Right—Fig. 11—Hot plate apparatus to vaporize air within a room.

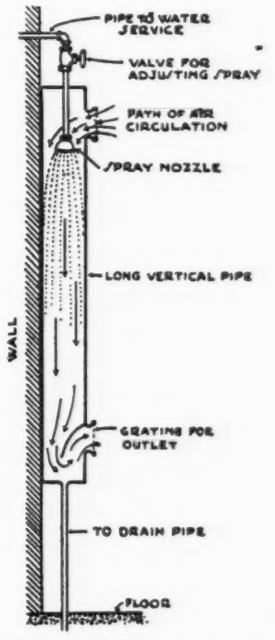


Fig. 12—Spray type room vaporizer.

TABLE I—DETAILED REQUIREMENTS FOR FUEL OILS[1]

Grade[2]	Flash Point °F. Min.	Pour Point °F. Max.	Water and Sediment Percent Max.	Carbon Residue Percent Max.	Ash Pct. Max.	Distillation Temperatures °F. 10 Pct. Point Max.	90 Percent Point Max.	90 Percent Point Min.	End Point Max.	End Point Min.	Viscosity Seconds Saybolt Universal (at 100° F.) Max.	Saybolt Universal (at 100° F.) Min.	Saybolt Furol (at 122° F.) Max.	Saybolt Furol (at 122° F.) Min.
No. 1. A distillate oil for use in burners requiring a volatile fuel	100 or legal	165	15[3]	0.05	(D)	...	420	...	...	590	...	...	...	...	...
No. 2. A distillate oil for use in burners requiring a moderately volatile fuel	110 or legal	190	15[3]	0.05	(D)	...	440	600	...	...	590	...	...	...	...
No. 3. A distillate oil for use in burners requiring a low-viscosity fuel	110 or legal	230	20[3]	0.1	0.15	...	...	...	600[5]	...	...	55	...	...	...
No. 4. An oil for use in burners requiring a low-viscosity fuel	150	...	..	1.0	...	0.1	...	...	...	...	...	250	55	...	...
No. 5. An oil for use in burners equipped with preheaters permitting a medium-viscosity fuel	150	...	..	1.0	...	0.15	...	...	...	...	...	...	250	100	...
No. 6. An oil for use in burners equipped with preheaters permitting a high-viscosity fuel	150	...	..	2.0[6]	...	...	...	...	...	...	...	...	...	300	100[7]

[1]Recognizing the necessity for low sulfur fuel oils used in connection with heat-treatment, non-ferrous-metal, glass and ceramic furnaces and other special uses, a sulfur requirement may be specified in accordance with the following table:

Grade of Fuel Oil	Sulfur, Max, Percent	Grade of Fuel Oil	Sulfur, Max, Percent
No. 1	0.5	No. 4	1.25
No. 2	0.5	No. 5	No Limit
No. 3	0.75	No. 6	No Limit

Other sulfur limits may be specified only by mutual agreement between the buyer and seller.

[2]It is the intent of these classifications that failure to meet any requirement of a given grade does not automatically place an oil in the next lower grade unless in fact it meets all requirements of the lower grade.

[3]Lower or higher pour points may be specified whenever required by conditions of storage or use. However, these specifications shall not require a pour point lower than O° F. Under any conditions.

[4]0.12 percent on 10 percent bottoms.

[5]This requirement shall be waived when the carbon residue is more than 0.07 percent and less than 0.15 percent.

[6]Water by distillation, plus sediment by extraction. Sum maximum 2.0 percent. A deduction in quantity shall be made for all water and sediment in excess of 1.0 percent.

[7]This requirement shall be waived when the carbon residue is 6 percent or more.

Recommended Revision of Fuel Oil Specifications

Scope

THESE specifications cover six grades of fuel oil for various types of fuel oil burning equipment.

General Requirements

2. The fuel oils herein specified shall be hydrocarbon oils free from acid, grit, and fibrous or other foreign matter likely to clog or injure the burner or valves. If required, the oil shall be strained by being drawn through filters or wire gauze of 16 meshes to the inch. (U. S. Standard Sieve 16, ASTM designation 1190 micron.) The clearance area through the strainers shall be at least twice the area of the suction pipe, and the strainers shall be in duplicate.

Detail Requirements[1]

3. The various grades of fuel oil shall conform to the detailed requirements shown in Table 1. It is the intent of these classifications that failure to meet any requirement of a given grade does *not* automatically place an oil in the next lower grade unless in fact it meets all requirements of the lower grade.

[1]The technical requirements of this commercial standard are identical in substance with the revision of ASTM Tentative Specification D396-34T adopted by Technical Committee C of Committee D-2.

Methods of Test

4. The requirements enumerated in these specifications shall be determined in accordance with the following methods of testing of the American Society for Testing Materials, except as may be required under paragraphs 5 and 6.

Flash Point

5. *Minimum.*—The flash point, instrument, and method for determining minimum flash point shall be those legally required for the locality in which the oil is sold. In absence of legal requirements, the minimum flash point shall be determined in accordance with the standard method of test for flash point by means of the Pensky-Martens closed tester, ASTM designation D93-22.

6. *Maximum.*—Standard method of test for flash point by means of the Pensky-Martens closed tester, ASTM designation D93-22.

Pour Point

7. Standard method of test for cloud and pour points, ASTM designation D97-34.

Water and Sediment

8. *Water and sediment.*—(For grades 1 to 5, inclusive). Standard method of test for water and sediment in petroleum products by means of centrifuge, ASTM designation D96-30.

9. *Water by distillation.*—(For grade 6). Standard method of test for water in petroleum products and other bituminous materials, ASTM designation D95-30.

10. *Sediment by extraction.*—(For grade 6). (Federal specification VV-L-791a, method 300.2, modified in accordance with Navy Department Specification 7-0-1e, paragraph F-6.) as follows:

10a. *Apparatus.*—Alundum (porous grade) thimbles, 1 inch in diameter by 2¾ inches high, weighing not less than 15 nor more than 17 grams, listed by the Norton Co., Worcester, Mass., as 5163 RA 98. The thimble shall be suspended from the condenser coil by means of a platinum wire so that it hangs approximately 1¾ inches above the extracting liquid and 1¾ inches below the condenser coil.

Extraction apparatus should be of such construction that the thimble is completely surrounded by the vapor of the boiling solvent. Siphon extractors must not be used.

10b. *Procedure.*—Place approximately 10 grams of the sample in the previously extracted and dried, accurately weighed thimble and weigh to 10.01 gram, place in the extraction apparatus, and extract with 90 percent benzol until the solvent dropping from the thimble is colorless. The rate of extraction shall be such that the mixture of oil and benzol in the thimble does not rise to within ¾ inch of the top. Dry the thimble for 1 hour at 105° C., and weigh to 10.0001 gram. Repeat the extraction until the weight of the dried thimble and sediment is constant. For reference tests a new extraction thimble shall be used.

Carbon Residue

11. Standard method of test for carbon residue of petroleum products (Conradson carbon residue), ASTM designation D189-30.

Ash

12. Procedure for determination of ash as described in the standard methods of analysis of grease, ASTM designation D128-27. Sample shall be thoroughly mixed to insure that portion for ash determination is representative of the sample.

Distillation

13. Distillation of grade 1 oil shall be made in accordance with the standard method of test for distillation of gasoline, naphtha, kerosene, and similar petroleum products, ASTM designation D86-30; and of grades 2 and 3 in accordance with the standard

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methods of testing gas oils, ASTM designation D158-28.

Viscosity

14. Standard methods of test for viscosity of petroleum products and lubricants, ASTM designation D88-33.

References

15. Complete information regarding the procedure for making the tests specified, (excepting Sediment by extraction, paragraph 10), is to be found in the publications of the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa.

Significance of Tests[2]

16. Flash point—The flash point of a product may be defined as the temperature to which it must be heated in order to give off sufficient vapor to form an inflammable mixture with air. This temperature varies with the apparatus and procedure employed and consequently both must be specified when the flash point of an oil is stated.

17. The minimum flash point of oils used for fuel is usually controlled by law. When there are no legal requirements, the minimum values in the table are to be employed. Maximum values are specified in oils Nos. 1, 2, and 3 to insure the required ease of ignition.

Pour Point

18. The pour point of an oil is the lowest temperature at which it will flow when cooled and tested under prescribed conditions. Pour point specifications are included in order that oil may be secured which will not cause difficulty in handling or in use at the lowest temperatures to which it may normally be subjected.

Water and Sediment

19. Water and sediment are impurities which are almost entirely excluded in fuel oils Nos. 1, 2, and 3, and which are permitted in somewhat larger quantities in fuel oils Nos. 4, 5, and 6. It is difficult to eliminate them entirely from this latter group of oils, and the advantage is not sufficient to justify the cost. Water and sediment are determined together by the centrifuge, except for grade 6.

Carbon Residue

20. The carbon residue test when considered in connection with other tests and the use for which the oil is intended furnishes pertinent information and throws some light on the relative carbon-forming qualities of an oil. For medium viscosity and blended oils it is also used to detect the presence of heavy residual products.

Ash

21. The ash test is used to determine the amount of non-combustible impurities in the oil. These impurities come principally from the natural salts present

[2]For a more comprehensive description of the significance of tests on petroleum products see "The Significance of Tests of Petroleum Products," latest revised edition, published by the American Society for Testing Materials.

(*Continued on page 72*)

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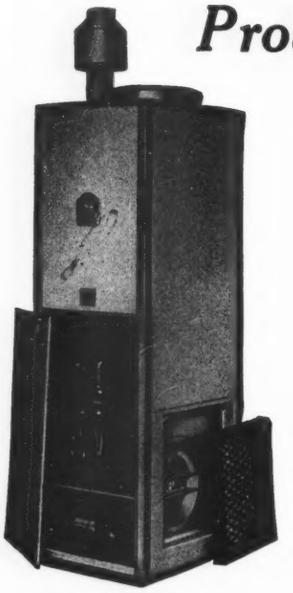

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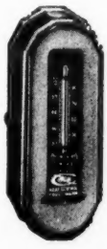


YOUR customers talk about you to their friends. Safeguard your most precious business asset—customer good will. Install Cook Controls on every job.

Cook controls give your customers comfort, convenience, economy, safety, accuracy, dependable long-life operation.

Cook controls give you an easy sale, simple installation, service-free operation, larger sales and profits.

Your customers depend on you for the best. You can give it to them—with Cook. We'll tell you how and why if you'll write today.

COOK CONTROLS

THERMOSTATS — FURNACE LIMIT CONTROLS
ZONE CONTROLS — BLOWER CONTROLS

COOK ELECTRIC COMPANY
2672 Southport Ave. CHICAGO

HERE'S PROOF OF THE POWER AND DRILLING SPEED of SKILSAW'S NEW DEFENDER DRILLS

THIS ½" DEFENDER DRILL drilled a ½ in. hole in ¼ in. stock in ONLY 28 SECONDS! Drilled a ½ in. hole in ½ in. stock in ONLY 40 SECONDS!
S.A.E. 1020 COLD ROLLED STEEL
½" DEFENDER $35.00
¼" DEFENDER $19.50
THIS ¼" DEFENDER DRILL drilled a ¼ in. hole in ¼ in. stock in ONLY 13 SECONDS! Drilled a ¼ in. hole in ½ in. stock in ONLY 22 SECONDS!

NEVER before such performance . . . such quality construction and engineering in low priced drills! Bearings are ball and self-lubricating Oilite bronze. Motor has extra overload capacity for cool running and longer life. Special alloy-steel gears, helical cut for quiet operation. Die-cast alloy frames for strength and lightness. Compare their specifications, power and speed and you will see why DEFENDER Drills are the biggest drill "buy" on the market.

See Your Distributor and Write for Our Catalog

SKILSAW, INC.

3302 ELSTON AVENUE, CHICAGO

210 E. 40th St., New York • 52 Brookline St., Boston
312 Omar Ave., Los Angeles • 2065 Webster St., Oakland

You can make BIG PROFITS

Parkway Lunch, Mansfield, Ohio, air conditioned by U. S. AircO is typical of thousands of small business places that are buying air conditioning

selling and installing

U.S.AircO

AIR CONDITIONING SYSTEMS

If you want to get into the *big* money in Air Conditioning—get into the commercial field. Thousands of small restaurants, cafes, drug stores, retail shops of all kinds, beauty parlors, offices, funeral parlors—need air conditioning—are going to buy it. *You* are the logical man to sell them.

U. S. AircO Systems are giving satisfaction in thousands of theatres and commercial establishments. U. S. AircO has now perfected low cost air conditioning systems for small installations — which give the same efficient results as the big ones.

Get the Facts NOW!

It is predicted 1937 will be the biggest year in the history of air conditioning. The big season is just ahead—find out now the sensational opportunity offered to the dealer who lines up with U. S. AircO.

U. S. AIR CONDITIONING CORPORATION
2105 Kennedy St. N. E., Minneapolis, Minn.
Please send information on U. S. AircO Air Conditioning Systems and exclusive dealer franchise.

Name .....
Address .....
City ..... *State* .....

You Tell 'Em

(*Continued from page* 49)

quickly—get over to your prospect the fact that you're not going to talk for hours and hours. Whet their appetites and interest something like this:

"Mr. Jones, you're entitled to have all the facts on automatic heat, but I don't want to take up a lot of your time. These pictures tell the story at a glance, so we can save a lot of time by using them as a guide."

See what you've done? You've sold him the idea of simply looking at pictures and that's something everyone likes to do.

Setting the Stage

Then (this is important) get them seated *together* in front of you. In that way you talk to both at once. Make the suggestion, "Won't you both sit here (point to davenport) so that you both can see?" It works every time. You'll find your job far easier and you can see then how your presentation is going.

Watch them and talk. No dramatics—no high pressure—no comedy—just a straight forward, sincere, conversational tone. You believe your story—it's true—why shouldn't they believe it? They will if you don't try to cram it down their throats.

And coach your talk so that it fits into things that are familiar to your prospect. If, for instance, you are selling a job that supplies filtered air, address most of your talk about clean air to Mrs. Prospect. Suggest to her that if she pays for the cleaning bills out of her allowance she can save money as well as work. Immediately you create in her mind's eye that extra pair of stockings she wants, or the new hat or dress. If you show her even a possibility of getting it she'll be on your side.

Go through your creative section in this manner. Answer the inquiries that may arise by referring to your visual sales manual. Never get away from it—keep attention focused to it and, when you see the prospect's frown of disapproval or question, be sure to clear up the point in question or transfer interest to some other subject.

Above all—*don't argue.* Hundreds of salesmen have won arguments galore, but lost the orders. When you meet the argumentative type, say over and over again, "As you *know,* Mr. Prospect." In that way he must sooner or later begin to agree with you about certain things just to convince you of the fact that he does know.

It isn't easy. This information is not magic hokus-pokus either. It takes more hard work than most of us have ever done, but it has two grand consequences—statistics prove it increases sales—and it gives us the feeling of a planned job, well done.

Bring your interview to the point of closing as soon as you can. Don't be afraid to ask for the order. What are you going to do after you've made your presentation and the prospect says, "No!"?

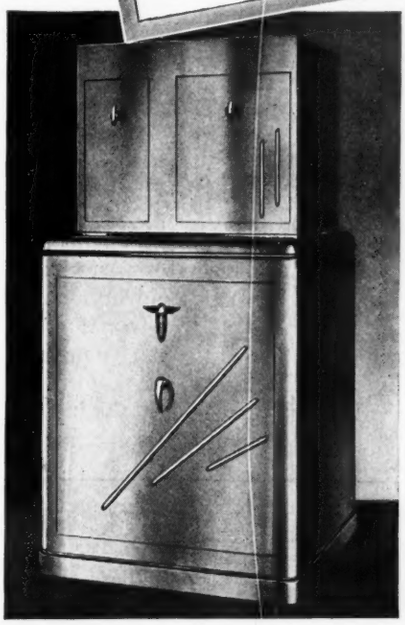
Well, that's what we're going to discuss next month—Sales Resistances and How to Overcome Them.

We've got to get that order.

Investigate Now the Enormous Possibilities in selling

JANITROL

GAS HEATING AND WINTER AIR-CONDITIONING EQUIPMENT



● You can satisfy every requirement for residential and commercial heating with the complete Janitrol line of gas-fired equipment—which includes WINTER AIR CONDITIONERS, GRAVITY HEATERS, UNIT HEATERS.

● In the great new building and remodeling market are thousands of prospects who will accept only gas heat. Educated to modern standards, they know that gas . . . and gas alone . . . offers fully automatic heating.

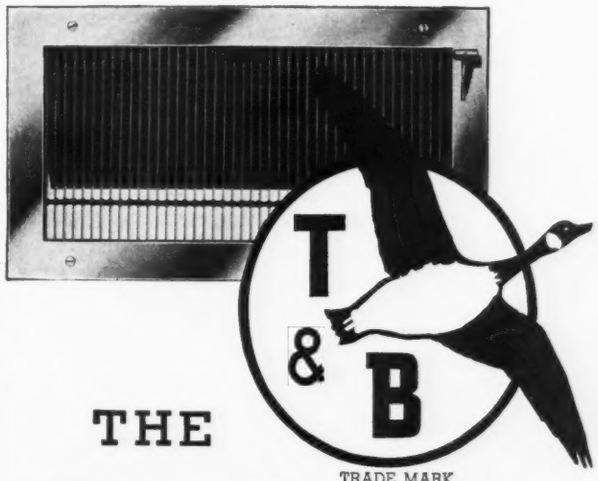
Along with heating modernization, a majority of these prospects want complete winter air conditioning. With the rapid extension of pipe lines for wider gas distribution . . . with the lowering of gas rates . . . they know they can now install and operate the preferred gas equipment at low cost.

In selling gas-fired Janitrol you will have behind you the organized program that is pushing gas heat to the front. You will be backed up specifically by Janitrol's great 1937 advertising program, which through national magazines alone is reaching the homes of 2,715,082 preferred prospects.

Janitrol equipment is engineered specifically for gas—by a company that has specialized for years on gas-burning equipment. Janitrol—easy to install and requiring minimum service—is the gateway to enormous new profit opportunities. Write for complete information.

SURFACE COMBUSTION CORPORATION • TOLEDO, OHIO

JANITROL WINTER AIR CONDITIONERS



THE AIRLINE REGISTER

TRADE MARK

- ECONOMICAL
- CLOSE MESH
- MODERN IN DESIGN
- STURDY & STRONG
- FIXED AIR DEFLECTION
- EASY TO PAINT
- EASY TO CLEAN

"THE STANDARD OF COMPARISON"

The Airline Register designed especially for Air Conditioning, is the latest achievement of Tuttle & Bailey engineers. Close mesh, modern in design and very rigid, this register may be used with any one of six standard frame constructions, or with one of four types of damper operators. The damper swings on bronze bearings, that will never rust. Fixed air deflection, bars set either vertically or horizontally.

Notice how nicely the Airline Register "fits with the picture" in this living room installation.

Tuttle & Bailey, Inc.
New Britain, Conn.
New York — Chicago
Boston — Philadelphia

Konzo Design of Duct Systems

(*Continued from page* 57)

offered considerable leeway in the matter of the selection of a fan to be used in connection with a given furnace. In fact, it was common practice for the installer to purchase a furnace from one manufacturer and to secure a fan from another manufacturer. The installer was then compelled to adapt the given fan to the furnace, to build suitable connecting pieces from the fan to the furnace casing, to build frames to support the filters, and to construct a suitable bonnet for the casing.

The estimation of the pressure losses through the filters, at the fan outlets, through the casings, and at the bonnet outlets was left to the discretion of the installer, as well as much of the responsibility of making the fan deliver the required amount of air. See Fig. 4a. If, as frequently happened, the installer did not properly evaluate the various pressure losses in the various parts of the system, then the required air delivery was not obtained. Under conditions of this sort, the usual recourse was to either increase the speed of the fan or to replace the fan with a larger unit.

During recent years, however, there has been a growing tendency on the part of the manufacturers to supply completely equipped units, complete with respect to furnace, fan, casing, and filters, that are commonly designated as "packaged units." These "packaged units" are the answer to the growing demand for standardization, for compactness, and for better appearance. It should be noted that completely equipped units of this type offer less leeway to the installer in making changes in the installation. If, for example, the unit is found to be deficient in its ability to circulate the required amount of air, the installer is faced with a more serious problem than in the case of the unit which was assembled from parts obtained by the installer from various sources.

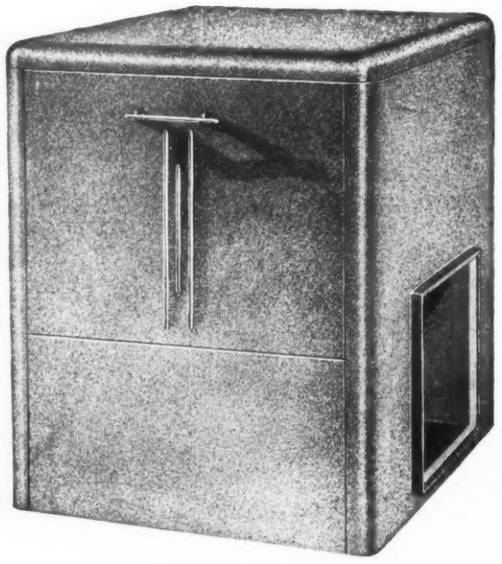
For example, any attempt to increase the speed of the fan will require a new pulley, a new belt, and possibly a larger motor. The substitution of a larger sized fan than that supplied with the assembled unit may not be possible due to limitations imposed by the space available in the casing. The proper estimation of the pressures, against which the fan must deliver its air, is even more important in the case of systems equipped with the "packaged units" than it was in the case of the units gathered and put together by the installer.

On the other hand, by the very nature of its method of assembly, the "packaged unit" offers greater possibilities in eliminating some of the guesswork that was inherent with the older system.

To the manufacturer of the equipment falls most of the responsibility of determining the performance characteristics of the unit. There should be no need on the part of the installer to make estimates of the pressure loss through the filters, the fan connection, and the casing. That should be part of the performance data to be supplied with each unit. In fact, the installer is less concerned about the magnitude of the internal

LAU 700 Series Package Unit Furnace Blower

Beauty . . . Low Prices . . . Easy to Install



No Extras to Buy!

Complete with Minneapolis Furnacestat Control, Variable Speed Drive, Motor, Filters, Blower, Blower Cabinet, and Two Full Size Access Doors.

Knock-Down Construction

Quickly and easily assembled in a matter of a few minutes, yet, more rigid than most completely assembled units. Access doors are located on both sides of the unit, permitting full access to motor, bearings, filters, variable speed pulley and adjustable motor mounting. Motor and drive assembly are reversible . . . may be placed on the most convenient side—on the job!

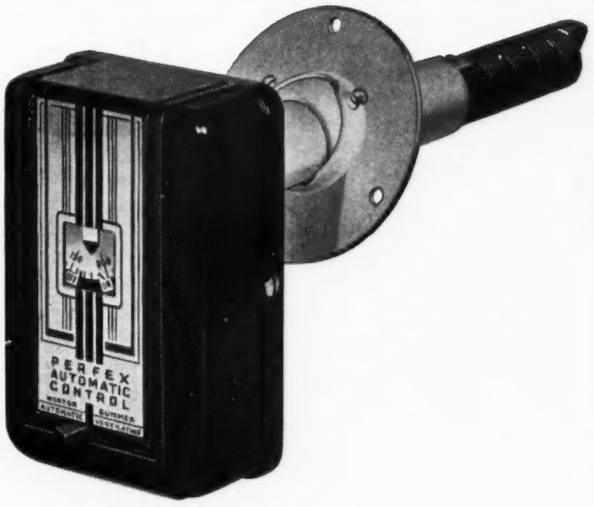
700 Series Features

- Access Doors on Both Sides
- Morocco Finish—Chrome Trim
- Light Gauge Top—Easy to Cut
- Variable Speed Pulley
- Furnacestat Automatic Control
- No Metal-to-Metal Contact
- Automatic Cut-Out on Motor*
- Leak-Proof Filter Frames
- Low Speed—High Pressure
- 3-Point Motor Load Distribution
- Leak-Proof Felt Connection
- 12 Sizes—No Extras to Buy

(*included on most models.)

THE LAU BLOWER COMPANY
DAYTON, OHIO

PERFEX



FAN CONTROLS

Perfex Fan Controls are carefully engineered for accuracy and dependability. They employ the exclusive Perfex heavy-duty, twin-contact switch which is not affected by vibration or off-level installation. Independent adjustment of cut in and cut out, full vision temperature indicator, ample wiring space and pleasing outward design, definitely set these Perfex Controls apart from the conventional type unit.

This fan control is also available with a built-in, summer-winter switch as shown above. By means of this switch, the fan may be operated manually, without need of changing temperature settings—an exclusive Perfex feature.

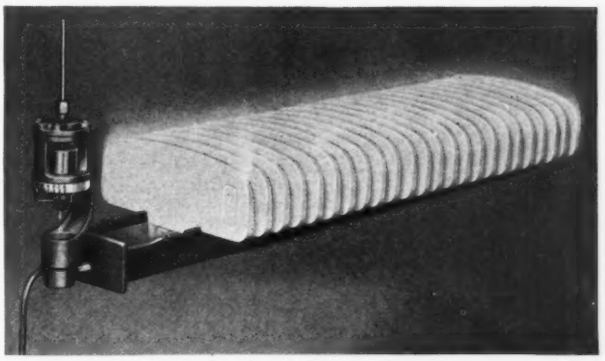
Write today

For more complete information and prices on these and other Perfex Controls shown in our new catalog.

PERFEX CONTROLS COMPANY
415 W. OKLAHOMA PLACE MILWAUKEE, WIS.

PERFEX

AUTOMATIC JUNE HYDRO-METRIC HUMIDIFYING SYSTEM



Self-contained Basement Type

THE ENTERING WEDGE for Bigger and Better Air Conditioning Business

Progressive dealers have found in Automatic June the logical leader for introducing air conditioning. For the very satisfactory humidification produced by Automatic June creates a most favorable impression and sets the stage for introducing other air conditioning equipment. Best of all, an Automatic June Hydro-Metric Humidifying System, either the Room-Controlled or the Basement-Controlled type, costs less than any other device comprising an air conditioning system.

Automatic June presents Superior Advantages

It provides adequate humidity in all weathers. But does not produce excessive condensation on windows in severely cold weather.

It occupies so little space in the heating chamber as not to interfere with air circulation.

Automatic June sets a new high standard in home humidification. It is unique, incomparable.

Write for new literature and details of our profit-making dealer proposition

MONMOUTH PRODUCTS CO.
231 E. 131st Street Cleveland, Ohio

resistance of the unit than about the external resistance against which the unit can deliver the required amount of air. See Fig. 4b. Hence, *the performance data for the unit should include the air handling capacity of the unit against a stated external resistance.*

Consider for example the case of a given fan which has an air handling capacity of 2000 cfm against a total resistance of 0.37 inch of water.

The usual manner in which the performance data of "packaged units" is presented; is as follows:

Btu output = 150,000 Btu per hour.
Fan Delivery = 2000 cfm.
Static pressure = 0.37 inch (total resistance)
Fan speed = 450 rpm.

In making use of these data the designer is compelled to estimate the magnitude of the loss through the unit itself, in addition to the losses through the ducts and registers which constitute the "external" system. There are enough approximations made in the determination of pressure losses without retaining those which can be eliminated.

Advantage of Rating

Suppose that in this example the performance tests, made in the laboratory by the manufacturer, indicate that the value of the combined losses through the filters, the outlet, the casing, and the bonnet outlet equals 0.17 inch. There exists a reserve pressure amounting to the difference between 0.37 and 0.17 or 0.20 inch of water. In other words, if the designer of the duct system can maintain the pressure losses in the return ducts, the warm air ducts, and the grille and register losses below approximately 0.20 inch the unit should be capable of delivering its full air quantity.

Therefore, a better way of stating the performance data of the same unit would be:

Btu output = 150,000 Btu per hour.
Fan delivery = 2000 cfm.
Static pressure = 0.20 inch (This applies only to pressure losses of ducts and registers, since the loss through the unit has been considered.)
Fan speed = 450 rpm.

In this case the designer need not estimate the losses through the filters and casing since they have been determined by test. Only the magnitude of the pressure loss in the "external" system remains to be estimated.

If it is assumed that performance data of completely equipped units will be presented in the latter form, then the design of the duct systems should be approached from a standpoint differing from that presented in the first part of this article.

Firstly, the available pressure of 0.20 inch will be dissipated in overcoming the following resistances:

1. Return grille
2. Supply register
3. Return duct
4. Warm air duct

HESS
EQUIPMENT GIVES UNEQUALLED QUALITY AND PERFORMANCE
◆ DISTINCTIVELY DIFFERENT ◆

The Benefactor Welded Steel Furnace is combined with the Hess Blower Filter Unit as one complete furnace, or the furnace or blower unit can be purchased separately.

BENEFACTOR WELDED STEEL FURNACE
Competes in price with ordinary cast iron furnaces, but excels ordinary steel furnaces in every way. Why sell ordinary type furnaces as sold by mail order houses when the Hess Benefactor furnace offers you far greater opportunity for profits?

HESS BLOWER FILTER UNIT
Is completely factory assembled, capacities up to 2,500 c.f.m., large hinged doors, motor high off floor, no expensive transition fittings required. Extremely quiet and many other features.

WRITE TODAY FOR DEALER PORTFOLIO OF ENTIRE HESS LINE
UNUSUAL EXCLUSIVE TERRITORY SELLING PLAN GIVES GREAT ADVANTAGES

HESS WARMING & VENTILATING CO.
FOUNDED 1873 1211 S. WESTERN AVE. CHICAGO, ILL

M-VB

HUMIDIFIER VALVES MEAN AUTOMATIC CONTROL

You can get the famous M-VB Humidifier Valve in four different numbers—for any type of warm-air furnace water-pan. No. 210, installed through pan-cover, float position set. No. 215, installed through pan-cover, float position adjustable. No. 220, installed through side of pan, float position set. No. 225, installed through side of pan with float position adjustable. *Any one of these can be installed in half an hour—without dropping the fire.*

All four numbers control humidity *automatically*, accurately, without attention. Can't corrode or stick, because all moving parts are above the water-line. And there is famous M-VB quality in all of them. You can be sure of an installation that will add to your good reputation.

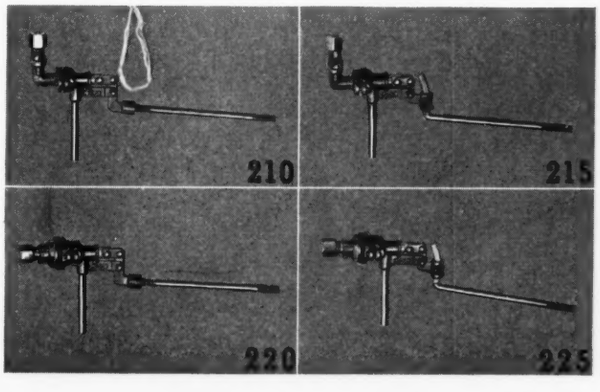
M-VB SCOVILL

A complete line of closet tank fittings

MORENCY-VAN BUREN DIVISION

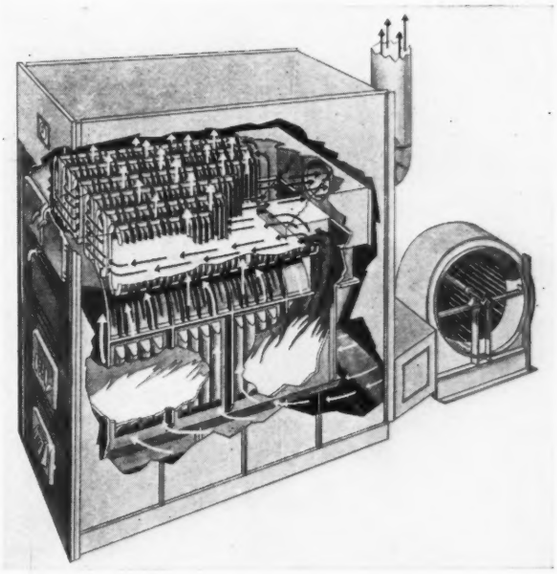
Scovill Manufacturing Company

Sturgis, Michigan



The ACME HEATER

"It's in the Fins"



PHYSICAL DATA—LARGE SERIES

Size No.	Dimensions Length	Width	Height	Grate sq. ft.	Heat Surf. sq. ft.	Free Area sq. ft. Min.	Free Area sq. ft. Max.	Wt. Lbs.	Max. Capacity Btu.
7	6'-6"	4'-0"	7'-0"	10.31	260	6.55	10.25	5900	900,000
8	8'-1"	4'-0"	7'-0"	11.91	340	7.73	12.50	7000	1,100,000
9	9'-8"	4'-0"	7'-0"	13.06	430	8.91	14.75	8000	1,300,000
10	11'-3"	4'-0"	7'-0"	14.43	500	15.82	22.62	9300	1,500,000
JUNIOR SERIES									
2	4'-6"	3'-6"	5'-8"	3.9	136	4.7	4.7	3200	350,000
3	6'-0"	3'-6"	5'-8"	6.1	183	5.9	6.9	4800	527,000
4	7'-6"	3'-6"	5'-8"	7.2$_4$	230	7.1	9.1	5000	634,000
5	9'-0"	3'-6"	5'-8"	9.3	280	8.3	11.3	6000	800,000

Note: For Automatic Firing Add 10% to Ratings Given.

Burns Any Kind of Fuel

The design of an all cast iron, direct transmission heater, such as the Acme, is not dependent upon the kind of fuel to be used. Any type of fuel may be burned. Suitable grates may be provided so that bituminous, semi-bituminous, anthracite coal, or other solids may be used with equal efficiency. Replacement of grates and linings by proper refractory material permits the use of automatic stokers on oil burning equipment.

Large Combustion Chamber

The Acme Heater provides ample space for the ignition of gases of combustion, regardless of the kind of fuel used. The unusually large combustion chamber, acting as "primary" heating surface, effects a very efficient transfer of heat, because of the great temperature difference between the burning gases inside the chamber and the air passing over the outside surface.

Efficient Radiator Section

Although the heating surface of the combustion chamber is large and efficient, still more heat must be extracted to obtain satisfactory overall efficiency. An inspection of the "phantom view" above will reveal how the gases of combustion enter the rear smoke chamber, flow to the front of the heater, and return again to the smoke-box. It is evident that the gases are held in intimate contact with the heating surface, six times the length of the heater, before they are permitted to escape.

High Ratio of Heating Surface to Grate Area

The radiator tubes are covered with extended surfaces, or fins, typical of those used on indirect heating coils. The long, oval tubes of the radiator provide an exceptionally large heating surface and, when combined with the surface of the combustion chamber, afford a remarkably high ratio of heating surface to grate area.

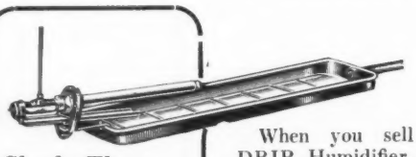
Balanced Construction

The construction of the Acme Heater provides ample free area and allows proper velocity of the air to be heated. Moreover, this air is brought into direct contact with as much heating surface as possible, resulting in the Acme of Efficiency.

ACME HEATING & VENTILATING CO., Inc.

4224 LOWE AVENUE CHICAGO, ILL.

VISIBLE EVIDENCE of
Simplicity in Humidity Control



Check These Plus Features—

- As unfailing in performance as the water supply.
- Balances humidity with indoor temperatures.
- All Parts in contact with water are Monel metal or stainless steel.
- No gimcracks or gadgets to confuse users or to add to cost.
- Valve always cool; never in or above water.
- Larger, more shallow pan . . . faster evaporation.

When you sell the THERMO-DRIP Humidifier, you have an immediate competitive advantage. Your prospects can *see* and *understand* why it assures positive control of indoor humidity the moment you point to the thermostat projecting over the pan. It means the amount of water admitted to the pan is measured—drop by drop—by the heat in the furnace bonnet. True relative humidity! It is the feature that makes THERMO-DRIP the modern *stand-out* in equipment to provide moisture for warm air heated homes. Cash in on this simplified humidity control before the heating season expires.

AUTOMATIC HUMIDIFIER CO.
CEDAR FALLS, IOWA

THERMO-DRIP HUMIDIFIERS

Use

MERCOID
CONTROLS

THEY GIVE ACCURATE AND DEPENDABLE SERVICE OVER A LONG PERIOD OF YEARS

MERCOID FAN AND BLOWER CONTROL

Used extensively throughout the warm air heating trade. There are many outstanding features on this control that are desirable

See catalog for complete list of Mercoid Controls

THE MERCOID CORPORATION - 4201 BELMONT AVE., CHICAGO, ILLINOIS
Please send Catalog No. 100-T

Name_____

Address_____

Secondly, if the resistance through the return grille is assumed to be equal to 0.05 inch and that through the supply register is assumed to be 0.05 inch, then one half of the available pressure has been accounted for. Therefore, 0.10 inch pressure is available for the return duct and warm air duct. If the resistances through the two parts of the duct system are assumed to be the same, then the resistance through the warm air duct system should not exceed 0.05 inch. Therefore, the duct system will be calculated on the basis that the total pressure loss will not exceed 0.05 inch.

It should be noted that the total frictional loss is estimated first. In Table 2 is shown a typical example of calculation procedure for this method, which has been designated as:

B. Equal friction loss method

2. Total pressure loss predetermined.

The method of calculation is similar to that shown in the second step of Table 1, except that the value of the total friction loss in column 4 is assumed as 0.05 inch instead of 0.04 inch.

Fuel Oil Revisions

(*Continued from page* 64)

in the crude oil, or from the chemicals that may be used in refinery operations, although they may also come from scale and dirt picked up from containers and pipes. The presence of ash in fuel oils causes rapid deterioration of refractory materials in the combustion chamber, particularly at high temperatures. Some of the ash-producing impurities are abrasive and destructive to pumps, valves, control equipment, and other burner parts. Ash specifications are included in order to minimize these operating difficulties as far as practicable.

Distillation

22. Laboratory distillation of a sample under prescribed conditions gives an index of the volatility of the oil. The 10- and 90-per cent points represent, respectively, the temperatures at which 10 and 90 per cent of the sample are distilled. The end point is the maximum temperature recorded by the distillation thermometer at the end of the distillation.

23. The 10-per cent point serves as an index of the ease of ignition of the oil and the 90-per cent point and the end point are specified to make sure that the oil will volatilize and burn completely and produce a minimum amount of carbon.

Viscosity

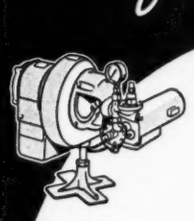
24. The viscosity of an oil is the measure of its resistance to flow. Maximum limits are placed on this property because of its effect upon the rate at which oil will flow through pipe lines and upon the degree of atomization that may be secured in any given equipment.

25. Viscosity is measured as the time in seconds required for a definite volume of oil to pass through a small tube of specified dimensions at a definite temperature.

SCOTT S-N NEWCOMB

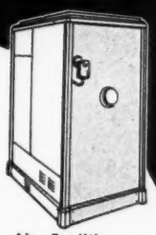
Complete Line

AUTOMATIC HEATING and AIR CONDITIONING Equipment

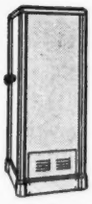


Oil Burners (8 sizes)

Boilers, Cast Iron, Steel (Oil, Gas, Stoker)



Air Conditioners (Oil, Gas, Stoker)

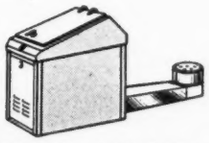


Water Heaters (Oil, Gas, Stoker)

S-N DEALERS PROSPER *because*

1. There's an S-N product for every month in the year.
2. "S-N" means highest quality—at competitive prices.
3. The industry recognizes S-N as pioneers and authorities in the field.
4. A complete line of easy-to-sell accessories "opens up leads" for major equipment.

Room Coolers and Central Cooling



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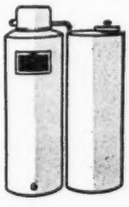

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They know that Aerofin performance has been *proved* in thousands of installations. They know that they can specify it with confidence, secure in the knowledge that it will live up to its reputation as the most advanced type of heat-exchange surface on the market.

There are many reasons for Aerofin's superiority. For example—Aerofin's crown orifice in heating units prevents scale clogging. Aerofin's centrifugal header in direct expansion units assures rapid and even distribution of refrigerant through the coils with a minimum number of expansion valves. Aerofin's removable header on water units permits easy cleaning of tube interiors.

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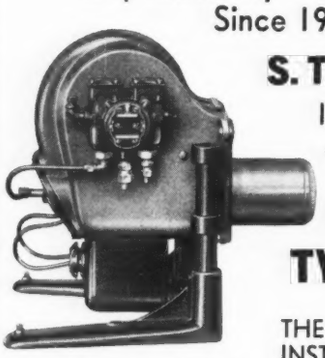

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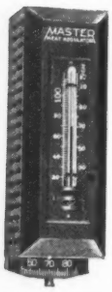

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WHITE MANUFACTURING CO.
2362 University Ave., St. Paul, Minnesota

Madison Splitters In Elbows

(*Continued from page* 58)

Even a small inside radius instead of a sharp corner will materially cut down elbow loss as shown by the curves in the original paper.

A word about duct systems for residences may be added here. The use of a fan for air circulation has greatly improved heater performance over that existing with the gravity warm air furnace. Only too often, however, the mistake is made of assuming that a fan will overcome all distribution difficulties. Frequently a heater is installed in one corner of the basement farthest distant from a room with, perhaps, the largest heat loss. Such an arrangement calls for at least partial insulation of duct work to insure proper heating. If the system is to be quiet and economical of power, low loss elbows should be used. A more central location of the heater simplifies the distribution problem, even though a fan is employed.

Duct Insulation

Where ducts are not insulated there is something to be said in favor of small sized ducts with higher velocities; the overall heat loss is somewhat less. On the other hand, higher velocity necessitates keeping all losses in the connections as low as possible to offset the higher friction in the duct itself.

Round ducts, while simple and economical in themselves have the disadvantage of disturbed flow in branches and elbows. Frequently round pipes are used for branches and are connected to the rest of the system by transformations. Obviously, this is only practical for the longer runs. Where head room is an important item the rectangular duct has the advantage that it can be proportioned to suit conditions.

As was pointed out in the original paper the pressure loss of an elbow is not greatly affected by size. If, therefore, one is accustomed to figure an elbow as an equivalent length of straight duct that method is permissible as long as the radius ratio of the elbow is known. The usual low loss elbow of 1½ center line radius has a loss equivalent to a length of 8 to 10 diameters of duct.

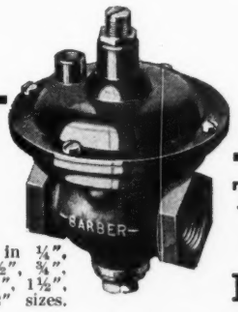
Although no tests were made with velocities below 1800 ft. per minute, it is reasonable to believe (from tests at higher velocity) that the loss (in velocity heads) at 900 to 1000 will be about 10 per cent higher than those recorded in this paper. That is, if an elbow from the chart shows a loss of 20 per cent velocity head, based on 1800 ft. per minute, it will have approximately 22 per cent velocity head at 900 ft. per minute.

To Figure Metal Surface

One interesting observation resulting from the tests is that for ducts of square cross-section the amount of material forming the flat sides of the elbow exactly equal that of the curved sides. This leads to the following equation for the total surface of any rectangular elbow.

$$A = \pi R (a + b)$$

where A = total square feet of material.



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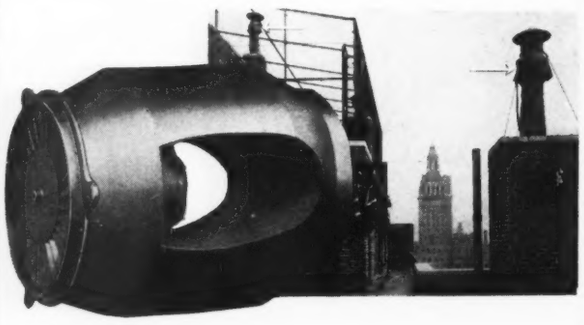
DE BOTHEZAT BIFURCATOR



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WRITE TODAY to Dept. AA-2 for literature describing our COMPLETE LINE of BURNERS and AIR CONDITIONING UNITS.

Oil Burner Builders, Inc.
BELLEVUE IOWA

R = center line radius of the elbow (average of inside and outside radii) in feet.

a and b = the sides of the duct in feet.

$\pi = 3.1416 =$ approx. $22/7$.

To this value of A must be added a percentage for seams and flanges depending upon the type of construction.

Velocity Pressure Defined

"Velocity pressure can best be pictured as a water, rather than an air, action. Suppose we imagine water flowing in an open trough or channel. That water has velocity; it moves; it can carry along with it other particles suspended in the water. If we should suddenly cap our hand over the end of the trough we would feel exerted against our hand a force, which is designated as velocity pressure or velocity head.

"*Velocity Head or Velocity Pressure* (abbreviated to V.P.) *is defined as that pressure which is required to create the velocity of flow.* Velocity pressure is dynamic, in the sense that it involves a movement of the particles composing the fluid.

"As air velocity increases, the corresponding value for the velocity pressure or velocity head increases very rapidly. An air velocity of 120 ft. per minute has approximately 0.001 in. velocity pressure; whereas an air velocity of 360 ft. per minute has approximately 0.008 in. velocity pressure. For air velocities up to about 600 ft. per minute the velocity pressure is relatively small. For air velocities above 600 ft. per minute, however, the velocity pressure is of fair-sized magnitude.

"The relationship between velocity of air and velocity pressure can be shown in tabular form (see Table A). For instance, a sharp-cornered bend may be considered as imposing a frictional resistance of '1.0 velocity pressure.' By referring to Table A it can be seen that the given section offers a resistance of 0.001 in. water gage when the air velocity is 120 ft. per minute, and offers a resistance of 0.008 in. water gage when the air velocity is 360 ft. per minute. Similarly the resistance at any other air velocity can be readily obtained from the table.

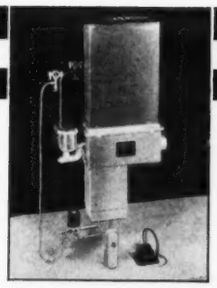
"Another duct section may impose a resistance equal to '0.5 velocity pressure' or '0.5 V. P.' At an air velocity of 360 ft. per minute the section offers a resistance of one-half of 0.008 in. or 0.004 in w. g."

TABLE A

Velocity Pressure Created by Air Velocity

Air Velocity		
Feet per second	Feet per minute	Velocity Pressure Inches Water
0	0	0
1	60	0.
2	120	0.001
3	180	0.002
4	240	0.003
5	300	0.005
6	360	0.008
7	420	0.011
8	480	0.014
9	540	0.018
10	600	0.022
12	720	0.033
14	840	0.044
16	960	0.058
18	1080	0.073
20	1200	0.09
25	1500	0.14
30	1800	0.20
35	2100	0.27
40	2400	0.35
45	2700	0.45
50	3000	0.56
55	3300	0.68
60	3600	0.81
65	3900	0.94

Note: These values are for 70 deg. F. and 29.92 in. mercury barometric pressure or an air density of approximately 0.075 lb. per cu. ft. For other air densities a slight correction is necessary.



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is furnace-heated . . . and so for the homes that are boiler-heated, Skuttle has developed this new direct-fired humidifier that doubles your opportunities for sales and profits. If you have not already written for complete information on this new money-maker, do so today! It's 1937's hottest news in the home humidification field! Address your request for information to:

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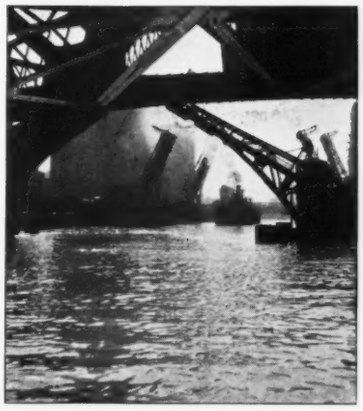

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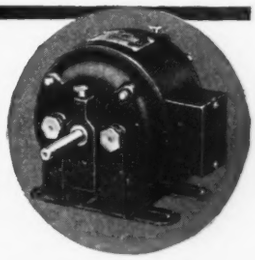

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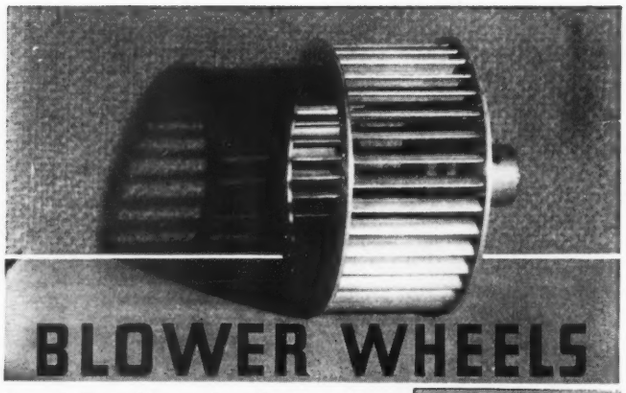

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Michigan State Short Course in Air Conditioning

THE Sixth Annual Forced Warm Air Short Course of Michigan State College—March 29-April 1—at East Lansing, Michigan, is conducted by the Mechanical Engineering Department, with the assistance of Dean H. B. Dirke, Dean of Engineering; L. G. Miller, Prof. of Mechanical Engineering; W. E. Reuling, Asst. Prof. of Mechanical Engineering; Edward Anderson, Instructor.

This course is sponsored by the National Warm Air Heating and Air Conditioning Association under the direction of the Technical Educational Committee—Webb Rybolt, president; Bruce McLouth, chairman; Fred Bishop; J. E. Maynard; Ed Root; Gilbert Denges; Frank Meyer; Prof. L. G. Miller.

The Technical Code for the design and installation of Mechanical Warm Air Heating Systems is used as the textbook for the entire course. This code was drawn up by the Code Committee of the National Warm Air Heating and Air Conditioning Association, headed by Prof. J. D. Hoffman of Purdue University. Two of the instructors of the course are members of the code committee.

The course is divided into an elementary course and an advanced and cooling course.

The elementary course covers heat loss calculations, insulation, figuring heat loss of a plan, building construction, the cfm. requirement, air movement and its control, figuring cfm. of a plan, humidity, duct design, automatic controls of force, laboratory demonstrations, figuring layouts of a plan, actual layout, figuring the season fuel cost, residential cooling, test problem plan, and a question box.

The advanced course covers a review of Btu. loss, air required for heating, insulation, figuring Btu. loss and cfm. requirements for a plan, building construction, duct design, air movement and its control, actual layout of a plan, humidity, computing Btu. gain, automatic controls, computing air requirements for cooling, computing Btu gain, laboratory demonstration, figuring the season fuel cost, residential cooling, selection of cooling equipment, test problems, figuring a cooling plan, and a question box.

Instructors and speakers in addition to the men already mentioned are: Frank Meyer, Meyer Furnace Co., Peoria, Illinois; Jay Barton, The Nelson Company, Detroit, Michigan; Sewell J. Downs, Clarage Fan Co., Kalamazoo, Michigan; W. G. Schlichting, Clarage Fan Co., Kalamazoo, Michigan; Robert Leigh, Hart & Cooley Company, Holland, Michigan; C. W. Nessell, Minneapolis-Honeywell Co., Minneapolis, Minnesota; and Joseph Alexanian, a merchant of East Lansing, Michigan.

Both courses start at 9 a. m. on March 29, and continue through April 1.

Complete information regarding the course may be obtained by writing Prof. L. G. Miller, Department of Mechanical Engineering, Michigan State College, East Lansing, Michigan.

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 100.

101—An Unusual Problem Solved

Hall-Neal Furnace Company, 1322 North Capitol Avenue, Indianapolis, Ind., is distributing an envelope stuffer entitled "An Unusual Heating and Ventilating Problem—and How It Was Solved." The solution was a zoned heating, conditioning and distributing system.

◆

102—Re-Humidifying Indoor Air

Monmouth Products Company, 201 East 131st St., Cleveland, Ohio, has issued a 16-page 8½x11-in. book entitled "The Science of Re-humidifying Indoor Air." This book contains authoritative, easily understood charts in color that explain air humidity and how it should be controlled. It gives facts which every heating contractor and engineer should know.

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103—Hy-Duty Blower-Filter Unit

Schwitzer-Cummins Company, Indianapolis, Ind., is distributing a 4-page folder describing and illustrating their Hy-Duty blower filter unit. Eleven superior features claimed are: flanged inlet, modernistic heavy steel cabinet, large access door, 4 filters, perfect filter seal, 14-in. diameter Hy-Duty blower, induction motor with automatic overload protection, variable speed drive (adjustable over entire range on the job), full floating rubber motor mounting, split cabinet construction for easy installation (all screws concealed), and sponge rubber outlet blower seal.

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104—S-N Air Conditioner

Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo., is distributing three new pieces of literature, describing their S-N air conditioner for either oil or gas fuel; the S-N oil furnace, for either oil or gas fuel; and the Pioneer CJ pressure burner.

The S-N air conditioner is a complete central plant for all year round, in three sizes—100,000, 200,000 and 400,000 Btu capacity at grilles. The unit combines either oil or gas burner, air filters, automatic humidifier and blower fans. Provision is made for special cooling coils in the duct work, served by a refrigerating unit, whereby the additional comfort of cooled and dehumidified air can be obtained.

The S-N oil furnace for steam, hot water or vapor heating systems is manufactured in three sizes—500, 1,000 and 1,500 ft. steam.

The S-N Pioneer oil burner is made in three sizes for installation in steam, hot water, vapor or warm air heating systems.

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105—Premier Automatik Folder

Premier Furnace Company, Dowagiac, Michigan, manufacturers of warm air heating and air conditioning equipment, has just issued a four-page folder illustrating and describing their Premier Automatik air conditioner, a combination furnace and air conditioner, designed for stoker firing. Right or left side stoker connections are provided for flexibility of furnace placement.

One of the features claimed is the Premier clinker cooler —an air-tight compartment within the furnace where clinkers may be dropped to cool, thus ending the dust and smoke nuisance where clinkers are allowed to chill outside the furnace. Then, too, the hot gases from the cooling clinkers must pass through the radiator where this extra heat is used.

The Premier Automatik filters, humidifiees, heats and circulates the air. Specifications are given for three models, producing 135,194, 201,512 and 375,898 Btu output at the bonnet.

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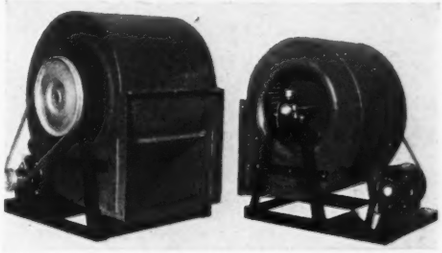

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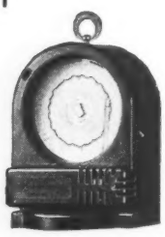

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MAUREY MANUFACTURING CORP.
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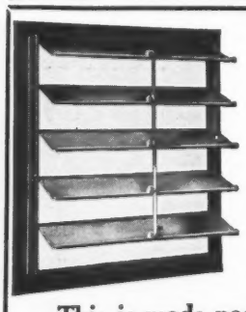


AUTOMATIC SHUTTERS

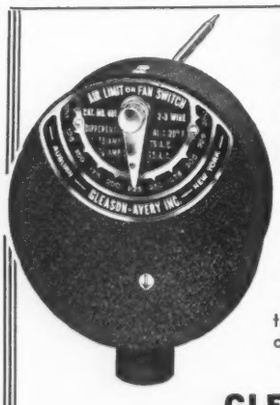
"Elgo Type"

"ELGO TYPE" Automatic Shutters are preferred for their smooth, silent, free and easy operation.

This is made possible by the rigid angle iron frame, that prevents the louvers from being warped or twisted out of line.

A product of the

ELGO SHUTTER & MFG. COMPANY
DETROIT *Write for details.* MICH.



OVERHEATING?

Stop It With a

GLEASON-AVERY

FAN SWITCH!

Overheating problems can be permanently licked by the installation of a reliable GLEASON-AVERY Fan Switch and Limit Control.

Quickly installed and easy to set to the desired temperature, it is indispensable on furnace installations.

Write for details.

GLEASON-AVERY, INC.
AUBURN NEW YORK

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 100.

106—The Mystery of Air Conditioning

Dail Steel Products Company, Lansing, Michigan, has just published a new booklet entitled "Taking the Mystery out of Air Conditioning." This booklet was published primarily to afford valuable and interesting information. It is written in plain, simple, understandable language and intended to clear away some of the "mystery" surrounding this term.

◆

107—Seabreeze Fan Ventilators

The Emerson Electric Mfg. Co., 1824 Washington Ave., St. Louis, Missouri, is distributing a four-page folder illustrating their fans and ventilators.

Two fan ventilators are described. Type 3350 fan mounted on an adjustable panel and Type 3350-AA fan and adjustable wall box.

Type 3350, for window or transom installation, is adjustable to the width of the window, easy to install and does not interfere with operation of the window. The motor is rubber mounted to insure silent operation. The finish is a washable French gray.

Type 3350-AA fan and adjustable wall box is easily installed, is adjustable to wall thickness and starts and stops automatically. Exposed parts of the box are built of galvanized, rust-resisting steel, electrically welded.

Specifications are included in the circular.

◆

108—Air-Conditioning Coils

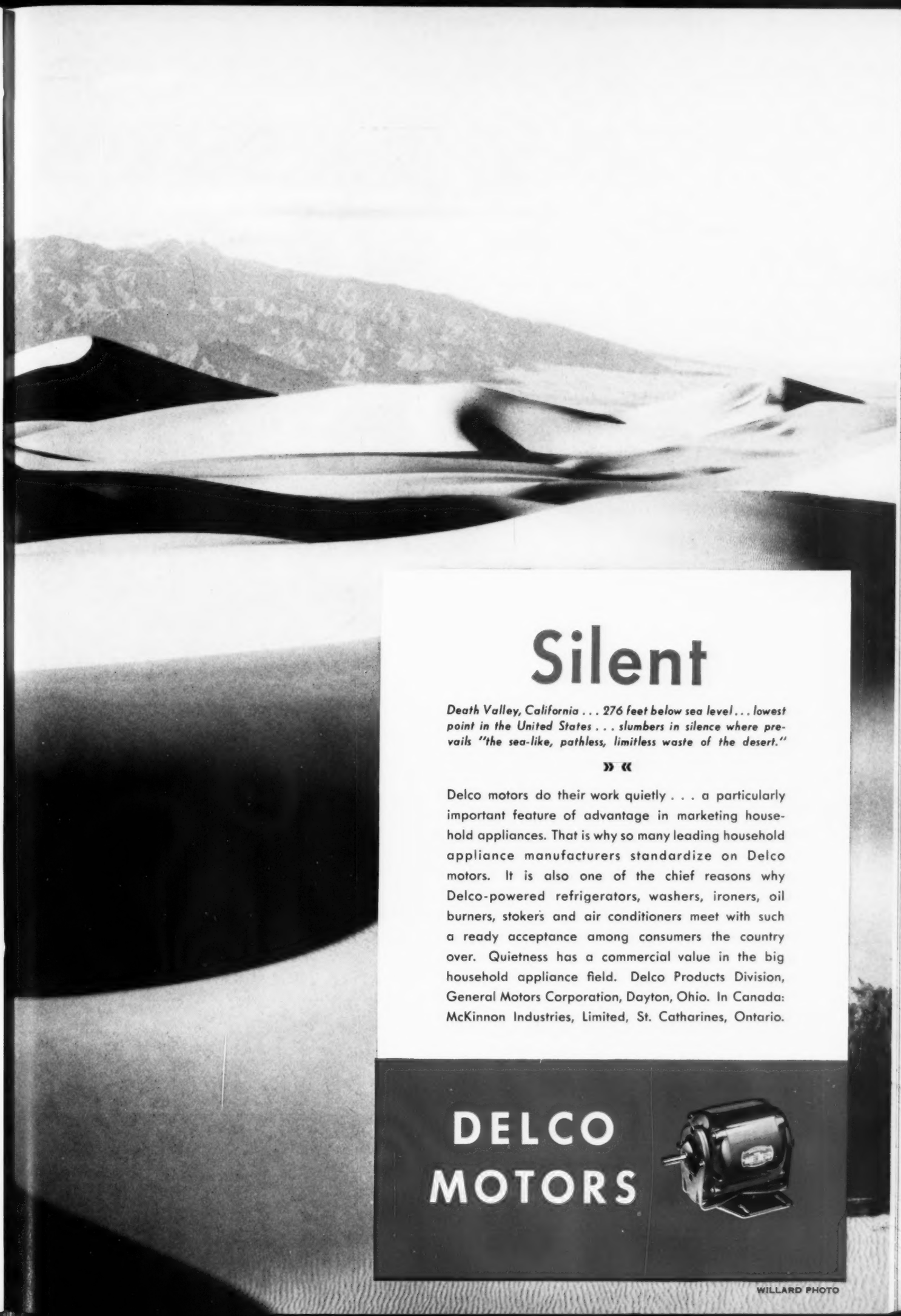
Fedders Manufacturing Co., Inc., 57 Tonawanda Street, Buffalo, N. Y., is distributing Bulletin No. 105, entitled "Fedders Water Type Air Conditioning Coils for Cooling and Dehumidifying of Air," a cooling data book and standard coil catalog.

Fedders water type air conditioning coils are being merchandised on a package basis. Coils of any depth or size may be obtained in sections and assembled in the field or at the factory. More than 550 standard size sections are available. Condensate drain holes are provided in all top and bottom brackets so that when dehumidification occurs the moisture will be carried away rapidly from the coil proper. The coil sections are made up with box type brackets having flanges all the way around, thus enabling several sections to be bolted together.

When cold water flows through a coil and warm air passes by, heat from the warm air will be transmitted through the fins and tubes to the water. For any given type of surface the heat transmission depends upon several factors—air inlet temperature, air inlet relative humidity, air velocity, water inlet temperature, water velocity, and number of rows of tubing in the direction of air flow. From any combination of these variables, the heat transmission obtained is divided into latent and sensible heat. To simplify determining the capacity of a given coil, Fedders has taken the most important range of variables met and outlined them in a "Log of Heat Transmission Data" with problems.

In order to efficiently utilize relatively high temperature water for air conditioning purposes, it is necessary to allow the water to flow through the coil in a direction opposite that of the air flow. By using this counter-flow principle, the warmest air meets the warmest water and the coldest air meets the coldest water, resulting in the greatest logarithmic mean temperature differential and, therefore, the greatest amount of heat transfer.

This bulletin contains rating tables with capacities of the coils, E. V. Hill's psychrometric chart, and other interesting charts, coil dimensions and layout and data useful to the cooling engineer.



Silent

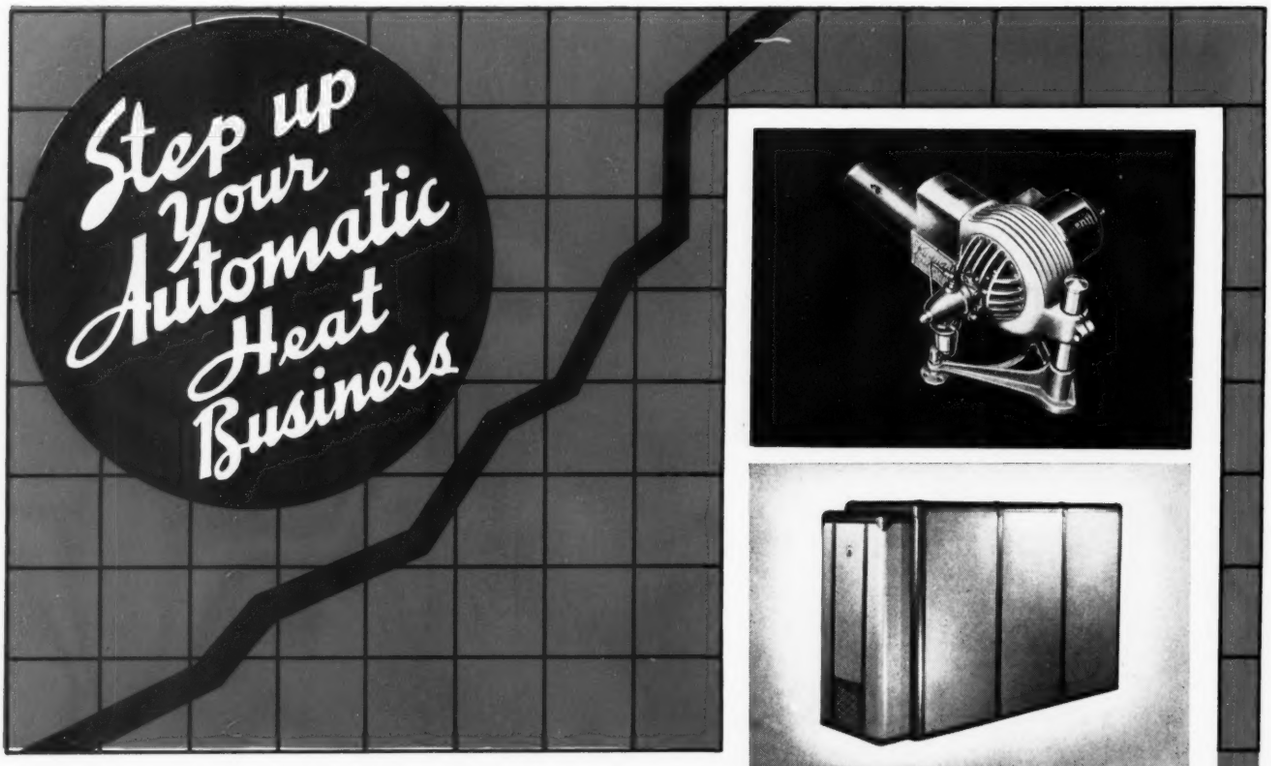
Death Valley, California . . . 276 feet below sea level . . . lowest point in the United States . . . slumbers in silence where prevails "the sea-like, pathless, limitless waste of the desert."

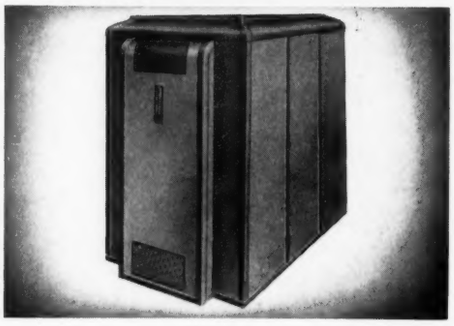
» «

Delco motors do their work quietly . . . a particularly important feature of advantage in marketing household appliances. That is why so many leading household appliance manufacturers standardize on Delco motors. It is also one of the chief reasons why Delco-powered refrigerators, washers, ironers, oil burners, stokers and air conditioners meet with such a ready acceptance among consumers the country over. Quietness has a commercial value in the big household appliance field. Delco Products Division, General Motors Corporation, Dayton, Ohio. In Canada: McKinnon Industries, Limited, St. Catharines, Ontario.

DELCO MOTORS

WILLARD PHOTO





With NU-WAY "Genii"

The Complete Line of Quality

The Success of every dealership is directly dependent upon the product he sells.

With Nu-Way "Genii," the complete quality line, you can do a better job and make more money.

Every product carrying the Nu-Way "Genii" trade mark is your assurance of precision engineering. Nu-Way has built automatic oil burning units to meet every requirement.

The Nu-Way 1937 Line includes—

First: Nu-Way "Genii" oil burners built in three sizes.
Second: Nu-Way Evans "Genii" winter conditioner.
Third: National Nu-Way Oil Heating Unit, steam or hot water.
Fourth: Nu-Way "Genii" Winter Air conditioner.
Fifth: Nu--Way "Genii" hot water generators built in two sizes.

These five products allow any good dealer to meet every market in his territory.

Write today and let us prove that you can step up your business with this outstanding quality line of oil burning, automatic heat.

THE NU-WAY CORP.

Rock Island, Illinois

Indiana's 18th Annual Convention

WITH Southern Indiana struck by flood waters, thus keeping many members at home and with bad driving conditions prevailing in the Northern part of the State, the 1937 meeting of the Sheet Metal Warm Air, Heating and Roofing Contractors' Association of Indiana suffered a lack of attendance, but carried on with a program quite as instructive and interesting as any held in recent years. Display space was fairly well filled with exhibits of high caliber—new heating apparatus, new metals, and equipment especially designed to make shop operation more economical were featured by manufacturers.

January 19 was devoted to meetings of various committees and the Board of Directors, with registration starting at nine o'clock in the morning, and exhibits opened to the public from four in the afternoon until ten o'clock at night.

On Wednesday morning the first session was opened with an address "The Progress of Asbestos Building Materials" by S. T. Dolen of the Keasbey & Mattison Co. of Chicago. Mr. Dolen cited the progress made in asbestos roofing and siding by showing how application of siding has increased from one-half million squares in 1932, 1933 and 1934 to one million squares in 1935 with the possibility of two million squares in 1936. Mr. Dolen appealed to the sheet metal contractors to give consideration to asbestos roofing and siding as application of these materials has always been a service of the roofing and sheet metal contractor and should not be overlooked in the drive for 1937 business volume. Mr. Dolen further suggested that the heating man, who ordinarily does not do roofing work, should consider roofing and siding in order that his contract with the home owner may include rehabilitation of the structure for better appearance or weather-tightness or insulation as well as the sale and installation of heating apparatus.

The effect of rigid shingle siding, properly applied, in eliminating or greatly reducing air infiltration was declared by the speaker to be one of the principal advantages of this material. While asbestos shingles or siding have no insulating value in themselves, due to the bonding of the asbestos fibre with portland cement, these materials do eliminate or reduce infiltration because when properly applied the siding will stop all cracks in the weather boarding and will greatly reduce or entirely eliminate cracks around window and door framing. The speaker suggested that when siding is applied the building should be straightened up and all hollows filled in in order that the new siding shall be perfectly level. The old weather boarding or siding shoud be covered with a waterproof felt closely nailed to the surface and carried tight against door and window framing. Over this felt the siding is applied, carrying the siding tight against door and window framing. In answer to questions from the floor, Mr. Dolen declared that an average good siding job should cost in the neighborhood of $15 a square with the selling price running from $15 to $20, depending upon labor conditions.

1937 Officers

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The "Sales Possibilities of Stainless Steel" were presented by George C. Joslin, of Tanner & Company, Indianapolis. Mr. Joslin reminded the convention that five years ago he predicted stainless steel would find many new applications and declared that his earlier prediction has been not only carried out in the past two or three years, but much exceeded. New applications have made the material popular for exteriors and interiors of buildings, for ornamentation or weather-proofness, for restaurant and hotel or cafeteria equipment, and for an enormous number of products requiring special metal to resist conditions of use. Mr. Joslin declared that it is interesting to note that many of these products and special uses have been produced by the average sheet metal shop in both large cities and small towns.

Declaring that the problems of fabrication are not too difficult and that any contractor with a working knowledge of sheet metal fabrication and with some possible additions to his shop tools and machinery can handle practically any type of stainless steel work, Mr. Joslin gave some fundamental principles for working stainless steel. Among these principles are the use of special shearing or cutting tools and machinery, properly set and selected for the work to be done; the necessary protective measures for preserving the polished surface; and the proper methods of handling stainless steel in the shop and on the job. Mr. Joslin explained that a vast amount of informative literature has been produced by manufacturers covering absolutely every phase of using stainless steel and that all contractors should have a file of such literature.

As a follow-up of Mr. Joslin's talk, a demonstration in soldering stainless steel sheets was staged.

F. R. Bechdolt, attorney for the State Unemployment Compensation Board of Indiana, addressing the convention on the subject of "State Unemployment Compensation Act," explained that unemployment compensation is not a new idea, but has been in force in 29 foreign countries for varying periods of years and in

only one country (Russia) has unemployment compensation ever been repealed. All changes in foreign countries have been in the way of extensions of the service, increases in payments, reduction in the waiting time, and increased periods during which compensation is paid. The speaker explained how payments are varied in different states, depending upon whether or not the state has a state unemployment compensation act, and how part or all of the tax paid is sent to state headquarters or to Washington, depending upon the status of the state.

"Basicly," declared Mr. Bechdolt, "the unemployment compensation act has two motives—(1) to stabilize unemployment, and (2) to give financial benefit to the unemployed."

The speaker explained that in Indiana each employer has his own account and all taxes paid are credited to this account. In addition, in Indiana, the unemployment compensation act carries a merit rating provision, under which when the employer's balance reaches 10.3 percent of the employers payroll for the preceding year, the rate of tax drops from 2.7 to 2.2 percent. Should the balance in the account reach 17 percent of the preceding year's gross payroll, the tax automatically drops to 1 percent for the year following.

Mr. Bechdolt declared that complete explanations of the act should be made as, for example, many employees believe that they are entitled to unemployment benefit regardless of the particular firm for whom they work. This idea is incorrect because the employee must work for an employer of eight or more during twenty weeks of the year and therefore any mechanic working for a sheet metal contractor who employs less than eight men in twenty weeks of the year is not entitled to any unemployment benefits.

"Employers" declared the speaker, "will benefit because: 1—Unemployment compensation eliminates direct poor relief and poor relief levies; 2—Reduces the heavy taxes for relief which are increased during the worst possible times of business; 3—Removes relief taxes and sets up a fund for unemployment compensation. The $15 a month compensation during fifteen weeks of unemployment far exceeds relief payments now made to unemployed persons; 4—Persons securing benefits will have money to continue purchasing power; 5—Unemployment compensation should tend to keep commerce moving."

"Things An Association Can Do"

"Some Things the Association Can Do for Its Members" was the subject of an address by Frank Ederle, secretary of the Michigan state association. Mr. Ederle declared that members of associations too often forget the many benefits of association activities, and cited as some of the beneficial accomplishments the education of contractors in the subject of costs, bookkeeping, overhead, and methods of conducting business.

Mr. Ederle made the interesting assertion that direct benefits through association members must come first of all through local associations; then through state associations which co-ordinate the work of local associations; and lastly through a national association whose work should deal with problems of national importance.

"The elimination of business practices which prevent the making of money and the education of contractors in ways and means of guaranteeing profits from his operations are the two greatest things which any association can do," declared the speaker.

Things Done in Michigan

Using the Michigan association as an example, Mr. Ederle declared Michigan does not believe in a contractor located in one town taking work in other towns in that state and that as a result of this policy most Michigan contractors operate locally and are not interfered with by contractors from outside cities. Michigan supplies a check of bids to eliminate the bid of the contractor who has made a mistake in his calculations. This bid service has also helped to eliminate the general contractor who is always driving down prices by means of bid peddling.

Mr. Ederle declared that with warm air heating advancing as it is strong local associations alone can prevent prices which are too low; alone can prevent utility companies or equipment manufacturers accepting the bid of the contractor who either has made a mistake or does not know just what his cost should be; alone can hold the sheet metal work from going to the seller who does not have a sheet metal shop. Mr. Ederle declared also that much of the ballyhoo over the "dear public" is not based upon hard business sense as the "dear public," when left to its own devices, generally becomes a price purchaser without giving consideration to ability or knowledge of the work to be done. Also, that he believes the local association is the logical body to handle investigation, writing of, and supervision of any codes or ordinances regulating installation practices, and that unemployment compensation should be enlarged to include every mechanic regardless of the size of the contractor for whom he works. Citing the value of the "Michigan Standards" which set a standard of coating for sheets, Mr. Ederle declared that Michigan will welcome the adoption of a similar standard by adjacent states and declared that the secretaries of the Midwest states are now discussing this proposition in their various meetings.

"New Mechanical Code"

At the opening of the Thursday morning session, Fred Bishop of the Brundage Company, speaking on the subject "The New Mechanical Warm Air Heating Code" explained briefly some of the limitations of the Mechanical Code now in use and outlined the problems which the new code is designed to solve.

The limitations of the new code will be approximately 250,000 Btu heat loss and the maximum air volume of 5,500 cfm. The building should not be over three stories in height and the register temperature may vary between 110 deg. minimum and 150 deg. maximum.

Among the things which the new code will do are: to define what constitutes a mechanical warm air heating system; to explain the manner of figuring heat losses for all exposures and due to infiltration; how to arrive at each heat loss depending upon the surface and the material of construction; to furnish a more accurate method of calculating infiltration either by the direct crackage method or by the air change method;

to provide a suitable list of heat loss factors for different types of construction; how to select the furnace size, whether the fuel be oil, gas or coal, with a formula for rating coal burning furnaces and recommendations for rating oil and gas furnaces; how to arrive at the total cfm for the building regardless of the heat loss in order to keep air turnover in rooms within satisfactory limits; how to select a suitable register air temperature based upon the heat loss and the air change; and to provide a means of sizing pipes to compensate for frictional resistance in the system. Other important factors covered in the code are temperature drop in ducts, resistance caused to transitions, turns, fittings, and so forth; and a practical procedure for designing duct systems.

Mr. Bishop explained that the code is now being given final consideration by members of the code committee and various engineers and that printed copies of the code will be available at a nominal cost within the very near future.

"Merchandising Air Conditioning"

I. W. Rowell of the Furblo Company, using "Merchandising of Air Conditioning" as a subject declared that advertising authorities all agree that any message must be repeated at least seven times to be impressed indelibly upon the minds of the prospective customer. This advertising rule might be applied to our own particular industry, and if applied would eliminate many of the waste efforts now being made to sell on one or two-time calls. "Air conditioning success," declared Mr. Rowell, "depends upon the contractor picking the right market—not the big house owner or the individual interested primarily in cooling, but the mass market composed of the individual who drives the low-priced automobile. The real property inventory shows over 600,000 homes heated with furnaces and over 320,000 stove heated dwellings in Indiana, giving at least some 750,000 to 1,000,000 prospects for winter air conditioning in this one state alone. Furthermore, the entrance of the large corporation into the residential air conditioning field should be proof enough that this market is highly attractive to the individual merchandising minded.

"I do not believe that one furnace in four, as reported in some surveys, is a true picture of conditions as they exist today, and also I do not believe that a good furnace should be replaced just to get a beautified new piece of heating apparatus. I do believe that we should make every effort to give the home owner air conditioning which he can afford and which will provide him with such functions as heat, circulation, cleaning, humidification, and where money is available, summer cooling. I also believe that we are overlooking a great market which can be tapped by means of the step by step selling method under which the home owner buys as much equipment as he can afford and adds to this equipment year by year.

"As I picture this industry, it is composed of three general operations—engineering, estimating and selling. Oftentimes the owner is all three services. Whether or not the owner conducts his entire business or has department heads, it should be the aim to give the prospective purchaser as economical a system as possible; to furnish an attractive installation, and to provide the satisfaction which the owner justifiably demands. It has been my experience that an attractive blueprint of the proposed heating system is a very strong sales argument and that the liberal use of the literature now available from practically all manufacturers will furnish the home owner with something he can study after the contractor has departed.

"Heat Controls"

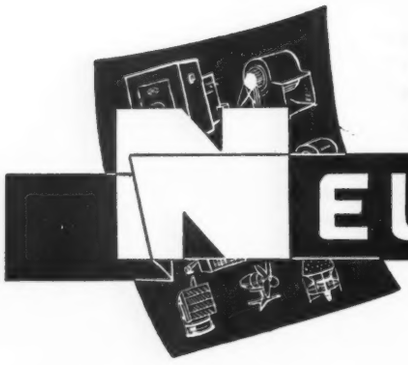
"Heat Controls," by B. C. Simons of Minneapolis-Honeywell Regulator Co., proved an interesting discussion of some of the common problems of control. Mr. Simons pointed out that manufacturers of control apparatus have more than met the demands of the contractor by providing instruments which will do practically every function now deemed necessary in the residential air conditioning system. He declared that a limit control is very necessary for all types of fuel and should always be recommended. He also urged contractors to use the many instruments now available and not to avoid them just because they look complicated. These new instruments perform all functions of older instruments and do so more reliably and more satisfactorily from the owner's viewpoint. The speaker asked consideration of the heat anticipating or heat accelerating type of thermostat in which changes in room temperature are anticipated by the thermostat, resulting in shorter and more frequent operating cycles of the heating apparatus thereby largely eliminating room temperature overrun or room temperature lag between the time the thermostat calls for heat and the thermostat is satisfied and the program control in which the thermostat is the master instrument.

"National Security Act"

The subject "The National Security Act" was presented by Albert A. Kuhle, who explained the differences between titles I and II of the Social Security Act. The speaker explained that there are three types of benefits under this act, namely: (1) monthly annuities beginning at the age of 65; (2) lump sum payment at the age of 65; (3) payment at death. The amount of money to be paid under any one of the three methods of payment, explained the speaker, depends entirely upon the earnings of the individual during his working life. The three requirements are that the individual be at least 65 years of age, has worked at least one day in each of five different calendar years after 1936 and prior to his reaching 65 years of age, and third, that he must have earned at least $2,000. If the individual is not qualified under (1), (2) or (3), he will receive a lump sum upon reaching the age of 65 equal to three and one-half percent of his total earned income.

"Despite many statements to the contrary," declared Mr. Kuhle, "there is no need for the contractor to invest large sums of money in special bookkeeping systems, bookkeeping forms for the purpose of entering unemployment compensation or old age insurance. The government is attempting to make the bookkeping required and the reports to be filed just as simple as

(*Continued on page* 95)



For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 100 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1936 Directory

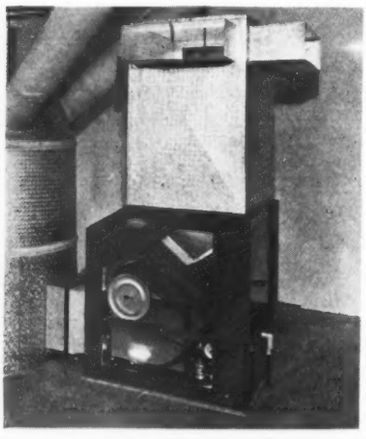
△ Indicates product and manufacturer not listed in 1937 Directory

NEW PRODUCTS

1—Stokolaire Blower-Filter Unit

Schwitzer-Cummins Company, 1125 Massachusetts Ave., Indianapolis, Indiana, announce a new addition to their line—the Stokolair blower-filter unit for warm air heating systems.

The Stokolair unit is unusual in design, has a permanent steel wire mesh filter, and is radically different in design from any other filter on domestic



warm air blower-filter units. This unit is equipped with a summer comfort damper, which enables the home owner to convert his unit from winter to summer operation by merely revolving the door. There are no latches or thumb screws on this door—a seal is maintained by rubber gaskets.

The Stokolair is available in only one size—Model 14 blower assembly.

◆

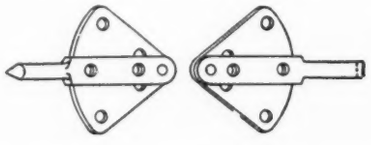
2—Dial Damper Regulator

Parker-Kalon Corporation, 200 Varick Street, New York City, announces the improved Parker-Kalon dial damper regulator (Cadmium plated finish) and new Universal bearings.

The dial damper regulator frame is made of heavy gauge steel in one piece and is so formed as to eliminate all air leakage, thus promoting efficient operation of the system. The graduations on the face of the frame clearly show the position of the damper in the duct. The lever is likewise formed of heavy gauge metal with no sharp or rough edges to cause possible injury. The bearing opening is extruded to provide ample contact on the bearing or rod, thereby eliminating rattling of the damper. Free and easy operation of the regulator is assured by the flanged construction of the lever which rotates upon the hub of the frame.

The wing nut serves to lock the damper in any desired position; and makes it possible to easily and quickly reset the damper position.

The makers say the regulator can



be installed on rectangular or round ducts in any required position. For dampers up to 10 in. ¼ in. size is required, while for dampers up to 20 in. the ⅜ in. size is needed.

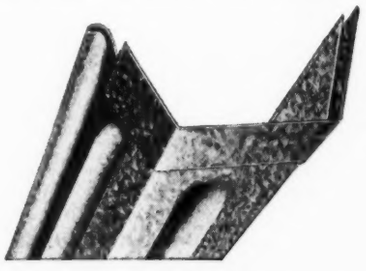
The new Universal damper bearings, of radically different design, can be used with equally satisfactory results for regular or splitter dampers, either rectangular or circular, the makers claim. These bearings are cold-forged from steel, and the steel mounting plate reinforces the damper and prevents it from buckling. The round end bearing is pointed for easy location in duct. These bearings are Cadmium plated to prevent rusting.

◆

3—Square Hanging Eaves Trough

Milcor Steel Company, Milwaukee, Wisconsin, announces an entirely new hanging eaves trough, known as Kuehn's gutter. Installed on a building it gives a box gutter effect because of its formation. Although the new eaves trough has an entirely different appearance, its application is the same as the ordinary half-round trough. The Titelock eaves trough hanger is readily adapted to this new square gutter.

Among the outstanding features claimed for the new Kuehn's gutter are its attractive appearance and the exceptional rigidity and strength achieved by the new design. The decorative flutings on side and bottom are among the seven re-inforcing features which make the gutter stronger, straighter, and more easily handled and worked than ordinary eaves trough. The line is complete with lap joint, slip joint, mitres, hangers,



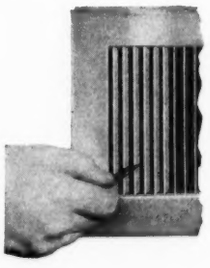
ends and drops. A high back is furnished for box gutter installation.

Patents on the gutter itself have been applied for and the entire process of manufacture is being thoroughly protected.

◆

4—New Registers and Grilles

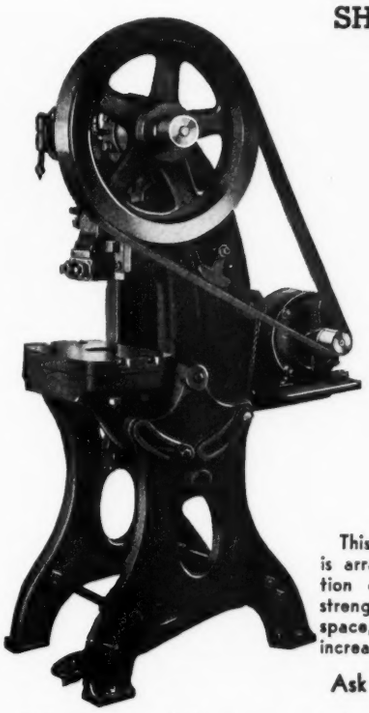
Hart & Cooley Manufacturing Co., 61 West Kinzie Street, Chicago, list six new designs among their air conditioning grilles, registers and intakes in their Catalog 37 now ready for distribution. Single-shutter valves are standard on all registers, but multi-shutter valves are available.



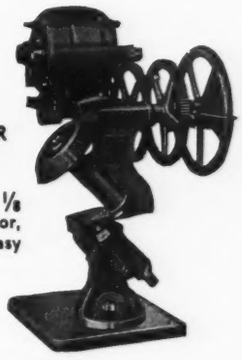
Of interest is their No. 84 design with a sectional adjustment feature of the vertical bars. The bars of each two-inch section are connected with each other so that if any bar is turned, all bars in that section turn simultaneously. Therefore, it is possible to have the bars in each two-inch section slanted at a different angle than any other two-inch section.

The MARSHALLTOWN Line

PRESSES—Capacities from 10 ton to 70 ton.
SHEARS—Capacities 18 gauge to ½" plate.



No. 116
THROAT SHEAR
Is especially designed for Cutting Inside Circles and Irregular Shapes.



No. 18
MOTOR POWER THROATLESS SHEAR
Complete with ⅛ HP standard motor, self-feeding and easy to operate.

No. 2
PRESS
This ruggedly constructed Press is arranged with proper distribution of weight giving maximum strength and affording ample die space, low operating cost and increased output.

Ask Your Jobber or Write

No. 18
HAND POWER THROATLESS SHEAR
For irregular cutting or straight splitting of 18 gauge sheets or lighter. Will cut sheets of any dimensions.

Marshalltown Manufacturing Co.
MARSHALLTOWN IOWA

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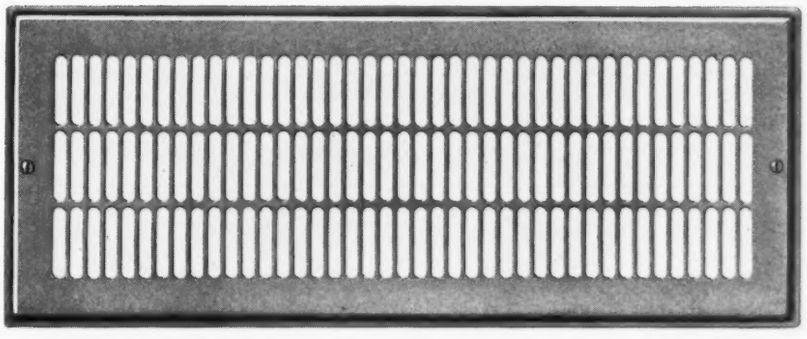
Standardize on

AUER
Registers *and* Grilles



Leading heating contractors have found that a substantial saving in money, time, and trouble can be made by depending on AUER for ALL their register needs. AUER customers appreciate the INTERESTED service they receive on both standard and SPECIAL requirements. Remember that AUER makes a complete line of registers (including all types of air-directional), cold air faces, and grilles, in all popular metals and finishes—for both warm air heating and air conditioning. Complete Catalog sent promptly on request.

• The famous AUER CLASSIC face (shown above) is a design of character and restraint, in good taste in the finest of modern interiors.

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 100

5—Introduces New Drills

Skilsaw, Inc., 3302 Elston Ave., Chicago, Ill., announces three new models to extend the completeness of its line of Skilsaw drills. These latest additions to the line are a Special Duty ¼ in. drill and two new models to be known as Defender drills, offering quality construction in a lower price range.

The new ¼ in. and ½ in. Defender drills have been developed to meet the demand for inexpensive tools. The motor construction is identical with

¼ IN. DEFENDER

that in the regular, higher priced Skilsaw drills—there is a greater than usual overload tolerance. Gears are made of special alloy steels, helical cut for quiet operation. The frame—like on Skilsaw drills—is a die cast aluminum alloy which is lighter, stronger and more durable than the conventional cast aluminum. Each model is fitted with a finest quality 3-jaw geared chuck and key. Both have Oilite and ball bearings on the armature shaft.

The new Model 40 Skilsaw drill has a ¼ in. capacity in steel. It is classified as a special duty tool—ideal for production drilling in light metals and for intermittent drilling in steel and cast iron. It has highest quality ball bearings mounted in all positions on armature and spindle. The frame is of light, durable die-cast aluminum alloy. Length overall is 12 in. and the weight is only 5½ pounds.

◆

6—New Damper Regulator Line

Hart & Cooley Manufacturing Co., 61 West Kinzie St., Chicago, is listing their new damper regulator line in Catalog No. 37.

These damper regulator sets are packed in attractive cartons, complete with parts, in two sizes—¼- and ⅜-in. bearings.

Outstanding features claimed are steel bearings that may be used with either splitter or regulator dampers; damper is held securely against both turning and end play, thus eliminating all vibration; handle may be removed after adjustment of damper, preventing tampering with damper; handle rotates in complete circle, permitting installation of regulator in any position; handle indicates position of damper; compact design of bracket permits installation near edge of duct and on either round or flat duct; snap bearing permits installation of the smallest

damper without bending; bearings, handle, screws and nuts are Cadmium-plated and bracket is die-cast, thus preventing rust.

◆

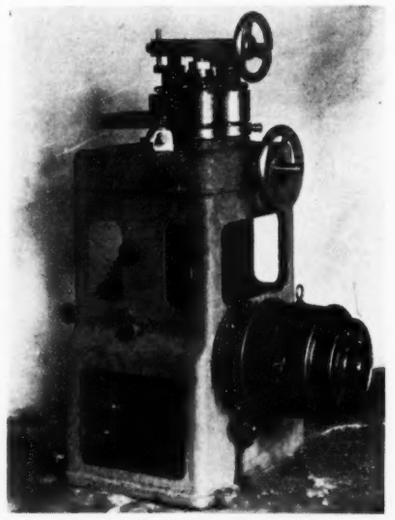
7—New Arc Welder

General Electric Company, Schenectady, N. Y., is introducing a new departure in arc welding—a low-range, direct-current welder, utilizing rectifier bulbs instead of rotating equipment. The welder, designed to operate on three-phase, 50- or 60-cycle power, 230, 440, or 550 volts, uses four mercury-Tungar bulbs.

This welder has ample capacity for welding all light-gauge car or truck parts in construction and maintenance work. It can be used to fabricate metal roofs and ceilings, steel cabinets, blower and ventilating systems, and steam fittings. Welding operators have found the new welder easy to use—characterizing its arc as "soft." It is easily portable, and has a current range of from 25 to 75 amperes, controlled by a nine-point tap switch.

8—Angle Bending Rolls

The Schatz Manufacturing Co., Poughkeepsie, N. Y., is introducing the "Schatz-Herkules" machines for rolling angles, tees, beams, channels, flats, etc. These are available in various sizes, for bending the smallest angle and up to 8x8x1 in. They have a unique feature in that the rolls are



adjustable for rolling the different profiles, eliminating the necessity of interchanging the rolls.

The accompanying cut illustrates sizes BO-8 and BO-9 for rolling up to 2x2x¼ in. and 2½x2½x$\frac{5}{16}$ in. angles respectively. The horizontal operation permits handling of the longest bars and largest rings. The guide rolls have both vertical and radial adjustment, which, together with the special roll design, assures the production of rings or arcs absolutely true and round, without twisting of the material. Finished rings are easily removed.

These machines may be had for either unit electric drive or belt drive.

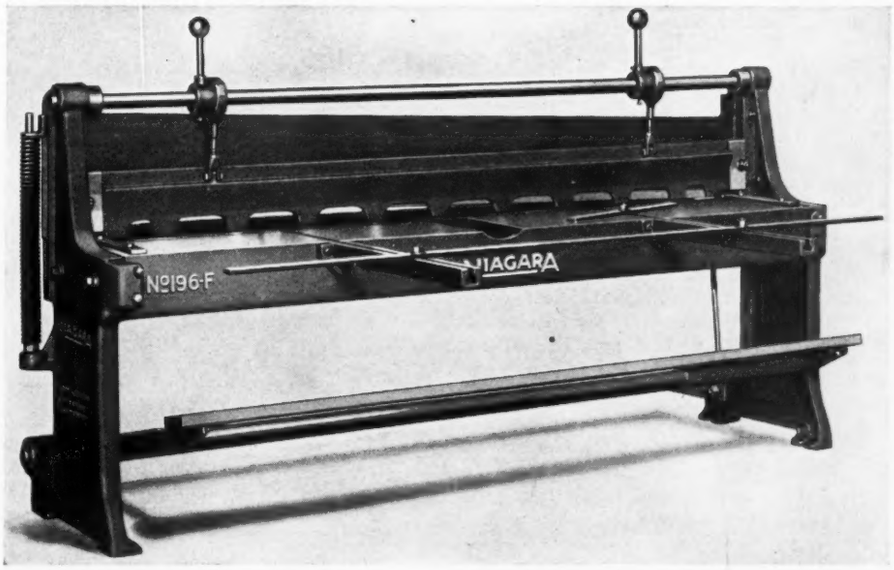
◆

9—Vulcan Electric Arc Welder

Vulcan Arc Welder Mfg. Co., 2636 Olive Street, St. Louis, Mo., announces the new Vulcan electric arc welder No. 300—a portable electric welding machine weighing 125 pounds—designed for machine shops, plumbers, steamfitters, air conditioning, furnace installation, ornamental and structural iron works. It will weld steel, cast iron, stainless steel, aluminum, etc. It will use any make of (coated) electric welding rod, $\frac{1}{16}$, $\frac{3}{32}$, ⅛, $\frac{5}{32}$, $\frac{3}{16}$ and will weld steel from 24 gauge up to ½ in. thick.

The No. 300 Vulcan has an output of 150 amperes, works on either 220 or 110 volts, 50 or 60 cycle AC current. The machine produces an even and steady arc. The welder is assembled in a stout, wood case, is provided with a safety switch and has 21 heat combinations. Equipment included consists of 15 ft. of welding cable with terminal and welding rod holder, 12½ feet ground cable with terminal and ground clamp, and 1 No. 199 Helmet type eye shield.

You Get Easy Operation, Accurate Shearing with



NIAGARA
FOOT OPERATED
SHEARS

This No. 196-F, Niagara shear is built for No. 18 gage capacity with 8 foot cutting lengths. Easy operation and accurate shearing make this shear ideal for the shop or out on the job where power is not available. Included in its features are clear visibility of cutting line, parallel screw adjustable back gage with steel graduated scale, front, side and bevel gages, Niagara steel laid knives with alloy steel cutting edge, T slots in bed graduated for setting gages, bed recessed in center for convenience in handling sheets. Write for Bulletins on the complete line of Niagara foot and power shears, with and without gap.

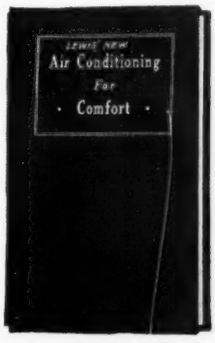
Money Makers for Your Sheet Metal Shop

Folders—Brakes
Groovers—Seamers
Slip Roll Formers
Power Presses
Shears, Squaring, Rotary
Lever Shears—Punches
Machines for Turning, Wiring, Beading, Burring, Flanging

NIAGARA MACHINE & TOOL WORKS, BUFFALO, N. Y.

NIAGARA

KNOW AIR CONDITIONING



Learn every phase of this important subject by sending today for a copy of

LEWIS' NEW
"Air Conditioning for Comfort"
by SAMUEL R. LEWIS

277 *Pages*—$2.50
Large Psychrometric Chart

So understandably does this new volume cover all angles of air conditioning that already dozens of schools teaching air conditioning have adopted it as a text. From it anyone may quickly acquire a thorough knowledge of equipment, psychrometry, refrigeration, humidification, dehumidification, heat transmission, heat absorption, air distribution, and water circulation. It also explains every step in the design of a complete heating and cooling system for a typical residence and a typical commercial building.

Send $2.50 for a copy today. You may return the book and your money will be refunded promptly if it does not prove satisfactory in every way.

KEENEY PUB. CO. • 6 N. MICHIGAN • CHICAGO

NU-DRY FURNACE CEMENT

"Best by Test"

There is one distinct advantage in using Nu-Dry Furnace Cement—you eliminate the risk of cracking, powdering or bloating when furnace is fired immediately after applied — it also withstands higher temperatures, does not shrink and keeps joints tight at all times. It is not affected by temperature changes, does not harden in containers and requires only half the usual amount of cement for a job.

THE PYROLITE PRODUCTS CO.
1221-1231 West 74th Street, Cleveland, O.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 100

△10—Jefferson Temperature Controls

The Jefferson Electric Company, Bellwood, (Suburb of Chicago) Illinois, has just placed on the market a line of temperature controls for industrial and domestic applications.

All types incorporate the same principle of operation; a bimetallic element

which actuates a mercury switch. This mercury switch is unbreakable, the case being of metal instead of glass and completely sheathed in molded Bakelite. The new features of design assure a useful life of many operations with constantly uniform regulations and extreme accuracy on close operating differentials. Cases are of one-piece construction finished in crackled art lacquer, with easily readable outside dials and attractively knurled regulating knobs.

◆

△11—Chemical Metal Colorings

Mass and Waldstein Company, Newark, N. J., state that the colors produced on metals by the anodic process and other chemical coloring methods can now be economically produced by their new line of enamels.

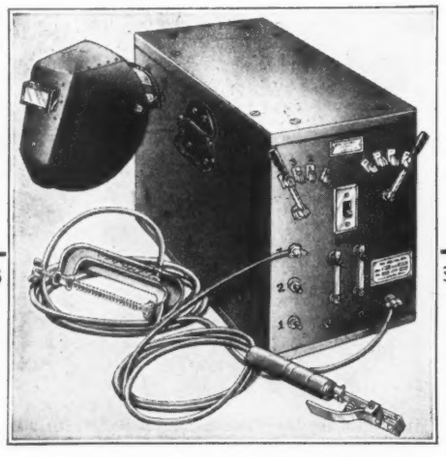
This new type of enamel, known as "Platelustre," is semi-transparent and, when mixed with clear lacquers gives a clear, brilliant, transparent colored effect that is said to be fast to light and very durable. Platelustre is supplied in a large assortment of colors, permitting the reproduction of all popular chemical metal coloring effects as well as making possible new effects, without the use of chemical processes.

Metal of all kinds can be finished with Platelustre. It is especially suitable for products where a brilliant colored metallic finish is desired.

●12—Weir Air Conditioning Test Set

The Meyer Furnace Company, Peoria, Illinois, announces the Weir Air Conditioning test set, providing a set of five uniform hand-calibrated wall-type thermometers with a range of 30 to 100 deg. F, for ascertaining temperatures in as many rooms at the same time, and one shielded pocket-type thermometer with a range of 0 to 220 deg. F. for ascertaining register temperatures.

The thermometers, they say, are high-grade Taylor Bros. products.



SAVES TIME

SAVES MONEY

VULCAN No. 300

The VULCAN electric arc welder is a strong portable machine especially designed for operation in sheet metal shops or on the job. It will operate off a 110 or 220 AC volt line.

Taking the VULCAN along on your various jobs means that all those air conditioning or furnace installations and structural or ornamental iron jobs can be done much faster and cheaper. The VULCAN will weld steel, cast-iron or anything else that can be electrically welded.

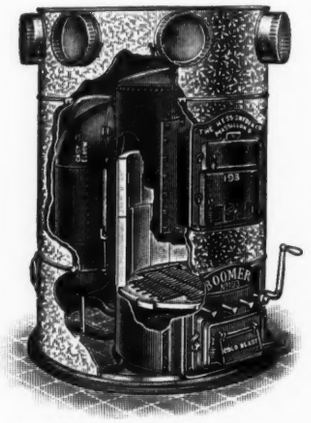
Equipment includes fifteen feet of welding cable with terminal and welding rod holder. Twelve feet of ground cable and one helmet type eye shield.

. . . . AND we've priced the VULCAN low enough so that it can be in every shop. Write for details.

Complete with all equipment . . . $147.50.

VULCAN ARC WELDER MFG. CO.

2636 Olive Street St. Louis, Missouri



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 23 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 23 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.

Massillon, Ohio

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 100

△13—Caulking in Cartridge

Calbar Paint & Varnish Co., 2612 N. Martha St., Philadelphia, has put on the market a cartridge, the "Handy-Load," containing "Caulk - O - Seal"

caulking compound, to eliminate the disagreeable, dirty and laborious job of filling caulking guns with bulk caulk from drums and cans.

The "Handy-Load" is a metal cylinder, ⅛ gallon capacity with a hard "sure fire" fibre plunger cap in one end, the plunger of the gun pressing against the cap and ejecting the caulk as the trigger is operated.

This cartridge slips into the new Albion 32-2x10 cartridge gun with no adjustments necessary or in any of the older type Albion guns by substituting a metal plunger for the leather plungers.

◆

△14—Enters Manufacturing Field

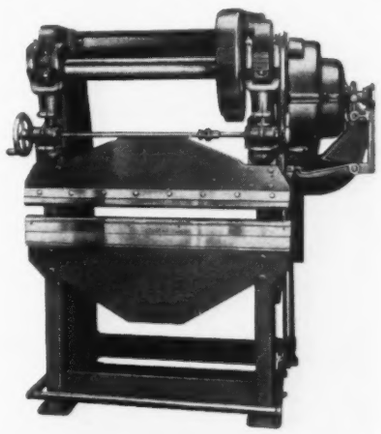
American Oil Burners & Heating Utilities, 4511 Fourth Ave., at 45th St., Brooklyn, N. Y., who in the past have been actively engaged as installation contractors, are now entering the manufacturing field with a new type domestic oil burner, automatic vari-port air valve, boiler booster, and generator, each containing patentable features.

Manufacturing is being conducted under the supervision of Daniel L. Finke, who is the designer of the products, and president of the company.

15—Whitney-Jensen Press Brake

The Whitney Metal Tool Company, Rockford, Illinois, has recently placed on the market a new power press brake known as the Whitney-JENSEN 47-4 ft. press brake. It has a capacity of making a right angle bend in mild steel 14 ga. thickness and 4 feet long.

The machine is double back geared, powered with a 3 h.p. motor which is



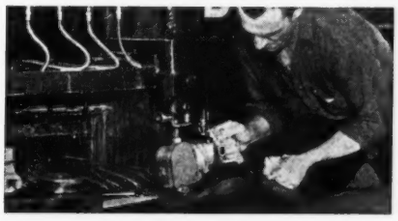
mounted, together with the flywheel, clutch, and all control linkages on the right-hand upright.

This machine was developed in response to a demand for a small, sturdy, and accurate press brake suitable for jobbing and production operations.

STANLEY UNISHEARS
THE ELECTRICALLY DRIVEN HAND SHEARS

STANLEY ELECTRIC DRILLS
LONG-LIVED . . . . . FREE-RUNNING

CUT COSTS ON DUCT WORK

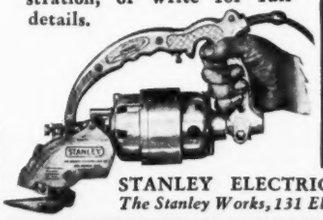


Duct work is one of the many sheet metal jobs where Stanley Unishears make slow, tedious hand cutting obsolete. Light, easy to handle, a Unishear saves time and energy *in the shop or on the job.*

Unishears zip through sheet metal as fast as you feed. Follow any straight or curved line accurately. Leave smooth, finished edges. Ask your Stanley distributor for a demonstration, or write for full details.

MIGHTY MIDGET
ONLY $59.00

Capacity, 18 gauge hot rolled steel. Weight, only 7 pounds. Will quickly pay for itself.



THE SHEET METAL WORKER'S FAVORITE

Stanley Electric Drill No. 121 is the favorite of sheet metal workers everywhere. A powerful drill with a full ½" capacity in steel. Straight line design for getting into close places. Oil sealed bearings. Weighs only 13 pounds.

"Can't lose" chuck key in housing. It's the ideal drill for all-around work on sheet metal. Ask your dealer for demonstration, or write for full details.

STANLEY HOLE SAWS

High speed steel hole saws for use with ½" and larger electric drills. 15 sizes, to cut holes from ¾" to 3½" diameter.

STANLEY ELECTRIC TOOL DIVISION
The Stanley Works, 131 Elm St., New Britain, Conn.

A Complete Line For Industry **STANLEY** STANLEY **ELECTRIC TOOLS** *"Cost Less Per Year"*

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 100

△16—Wonder Arc Portable Welder

Miller Electric Mfg. Co., Appleton, Wisconsin, announces a newly designed AC portable welder under the trade name "Wonder Arc." It is a special transformer type with a high power factor, having reactance control, static high frequency arc and sheet metal attachment that makes possible the welding of light weight metals. In capacity the new welders range from 125 to 600

amperes, standard voltage 220, 60 cycles, single phase. There are no electrical connections between the power input and the welding leads. As they are not autotransformer type, they can be used to weld on grounded systems, such as for thawing frozen water pipes. The exact amperage is supplied by a rotating knife switch control with amperage distinctly marked indicating each welding step.

◆

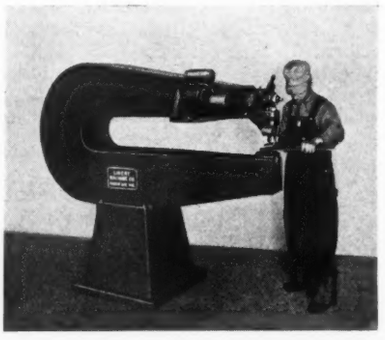
△17—Flue Gas Analyzer

The Hays Corporation, P. O. Box 299, Michigan City, Indiana, has brought out a new type of flue gas analyzer—the Hays Orsatomat—a portable analyzer that can be operated to give accurate reliable results even in the hands of an inexperienced and untrained operator. A pointer movement on a large legible scale indicated results plainly. The operator simply moves one lever.

The Orsatomat is available in a standard model for CO_2 and is also available in a twin unit model for analyzing for both CO_2 and O_2. Models with special scales are offered for use in testing automobile exhaust gases.

18—High Speed Shear

Libert Machine Company, Green Bay, Wisconsin, has completed a new high speed shear for irregular shapes, constructed primarily to cut 12-gauge



stainless steel or alloys of similar types. Designated as Model 1060, this large shear is made with an all-steel frame, fabricated and welded instead of the usual cast iron frame, 5/8x7/8-in. plate, to take care of all stresses and strains. It has a throat depth of 60 inches. and will maintain the same cutting speed as the standard shear, the manufacturer announces.

◆

19—Model CJS Burner

Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo., has some eight different models and types of conversion oil burners, both the air atomizing as well as the pressure atomizing types.

The new stream-lined model CJS

burner has a fuel burning range of from one to seven gallons per hour, they claim.

The pump is Scott-Newcomb design, having no gaskets, and operating with a dual seal, which makes for leakless and quiet operation. The automatic pressure regulator and Pioneer fuel saver is made a part of the pump, making for compactness and neatness.

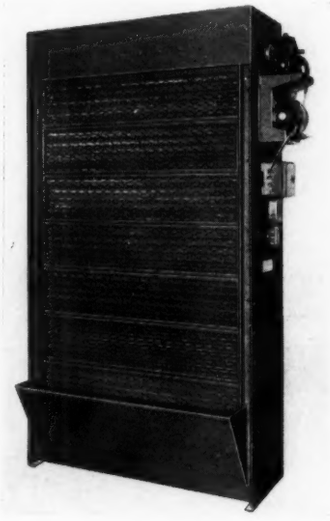
The air adjustment is made so that extremely fine adjustment can be had, and an acoustical material is located in the air receiver to reduce combustion and spark noise.

All units use baked on enamel with rustproof screws and parts.

◆

20—Self-Cleaning Air Filter

American Air Filter Company, Inc., Louisville, Ky., announces the Unimatic self-cleaning filter, developed especially for smaller than average air volumes where handcrank or push-button control is practical. Actually, the Unimatic filter is a self-cleaning unit filter, since the filter curtain is made up of a number of standard units. There are two additional units to those required to make up the curtain; one submerged in the reservoir being cleaned, and the other draining at the back of the filter.



The cycle of operation consists of raising the clean, drained unit to the top of the curtain and lifting the submerged unit to the draining position which permits the bottom unit in the curtain to slip down into the cleaning position. This change is made once a week, once a day, or as frequently as required by the size of the filter and the dust load, to maintain uniform operating conditions.

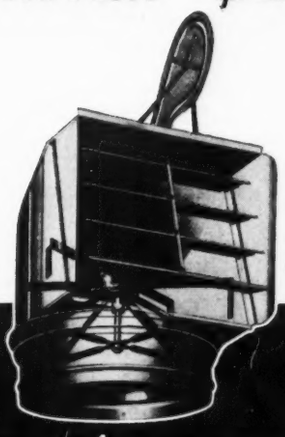
The Unimatic filter is made in capacities from 1,000 to 30,000 C.F.M. Its lower first cost, single pass filter curtain and methods of operation offer definite advantages which should insure wide use of this filter in the smaller commercial and industrial central air conditioning systems.

◆

21—Dodge Announces 1937 Trucks

Dodge Division of Chrysler Corporation, Detroit, Michigan, introduced its 1937 series of trucks and commercial cars on January 19, featuring numerous mechanical improvements and a brand new capacity model, and they claim still greater economy. The ¾-1 ton truck is the new addition to the line.

You take no chances when you recommend and install *Quality*



Swartwout
ROTARY BRONZE BALL BEARING
Ventilators

Their conservative rating assures capacity to spare.

They have strength, durability, and long life beyond any other.

There is nothing to get out of order.

Made of the finest materials;

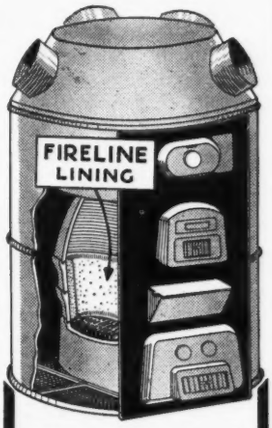
Bronze ball bearings and races, Armco galvanized sheet metal, and heavy steel interior members with rust-resisting finish applied after forming and punching.

They net you a generous profit and assure customer goodwill and future business.

What more could you wish in the ventilators you install—why be handicapped with less? Write for catalog today.

THE SWARTWOUT COMPANY
18615 Euclid Ave., Cleveland, Ohio

Every complete furnace job includes a refractory lining



Recent developments have brought industrial furnace efficiency to the home and today every *new* installation or *overhaul* job must be refractory lined to be strictly modern. FIRELINE, "fire brick" in plastic form is your best answer. Easily molded to any thickness completely around the firepot wall it protects fire pots from burning out, will even make badly cracked firepots gastite. Being a true refractory, it increases combustion temperature, eliminates smoke and soot, increases heating capacity and saves fuel.

For you, FIRELINE permits an extra profit on every job, opens a far wider (modernized) market for your services. Write for money-making sales plan that will keep you rushed the year around.

What is Fireline?

Fireline is *not* a furnace cement, is *not* a patching material — Fireline is a new thing—a plastic refractory material that comes ready-mixed in airtite drums. Molded to the walls of a firepot (any thickness) it sets with an ordinary fire into a 1-piece firebrick lining.

FIRELINE STOVE & FURNACE LINING CO.
1866-B Kingsbury St., Chicago, U. S. A.

FIRELINE

WHITNEY LEVER PUNCHES

No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies — ⅛" to ⅜" by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅜-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to ⅜" by 32nds.

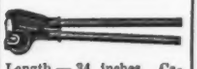
No. 91 PUNCH

Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5-inches. Weight—82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

No. 1 PUNCH



Length — 34 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅜ by 64ths.

No. 2 PUNCH

Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

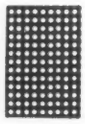
CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

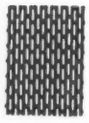
W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL

PERFORATED METALS

Every Sheet Metal Worker needs perforated metal in one form or another.



Finely perforated brass and tin-plate can be shipped quickly from our stock. In brass these sizes include No. 00 holes (.020" in diameter) to No. 8 holes (.138" in diameter); in tin plate—No. 1 holes (.027" diameter) to No. 8 inclusive.



You may find it convenient to draw upon this stock.

Aluminum, monel metal, copper, or other metals are perforated to order.

Everything in perforated metal.

For processing food products and to withstand certain chemicals special alloys are offered. Write us if you have such problems.

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill., New York Office, 114 Liberty St.

CHRISTIE FURNACE VACUUM CLEANER

A One-Man Super-Powered Machine

$99.50

(Subject to Change Without Notice)

F. O. B. Cincinnati with Tools and Attachments

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers.

DISTRIBUTORS WANTED: Write for interesting proposition.

CHRISTIE CLEANER COMPANY

Division of The Cincinnati Sheet Metal & Roofing Co.

226-30 East Front St. Cincinnati, Ohio

Wisconsin's Convention

(*Continued from page* 34)

"Automatic Controls"

Charles C. Cochran presented a discussion of control systems by the use of a moving picture film in which numerous types of electrical hook-ups for controlling coal, oil and gas furnace operation were illustrated. Among the many control systems presented were:

1. A very simple system in which the draft or firing device is controlled manually while the fan starts and stops from a bonnet instrument.

2. A system in which a furnacestat in the room controls the draft and check or the automatic firing device; the fan is operated by a bonnet switch.

3. A system similar to No. 2, except that the thermostat is wired into the fan circuit and when the thermostat calls for heat the draft opens or the firing device starts and as soon as bonnet temperature is built up, the fan starts. When the thermostat is satisfied, the draft closes, the fan stops.

4. A control system using a program switch which automatically reduces the setting of the thermostat at night. This particular control system also operates the automatic firing device or the draft, if hand fired; permits the fan to start when bonnet temperature reaches a preselected setting and stops the firing device or closes the draft and stops the fan when the room is up to temperature.

5. A control system for two-speed fan operation with a bonnet switch. The thermostat opens the draft or starts the firing device and so long as the bonnet temperature is below a preselected setting the fan runs on low speed. When the bonnet temperature rises above the preselected setting the fan changes to high speed and continues until bonnet temperature is again reduced.

The ultimate in control system suggested by the speaker was zone control and he illustrated this system with slides showing why zone distribution and zone control is effective.

Trip to Milcor Plant

One of the highly interesting features of the convention was the luncheon trip to the plant of the Milcor Steel Company. Members of the association were conducted through the Milcor plant in special buses and were divided into small groups; each conducted by a guide. All of the interesting machines in the plant were inspected and explained, as were the features of plant layout, how raw materials are received and distributed and manufactured products gathered together and made ready for shipment. The many tons of raw stock awaiting fabrication was first viewed, then the trip carried guests through the trimming department; the hammer room where siding and ceiling and other metal products are made; the press room and items are manufactured, and finally to the heating department where furnace pipe and fittings, elbows and accessories are all turned out in large volume.

Indiana Convention

(*Continued from page* 85)

possible and records can be kept "on the wall" if necessary.

M. A. Bush, speaking on "Contractor Insurance" explained that workmen's compensation is not very old as a law and in Indiana has been in force only since 1915. The Indiana Workmen's Compensation law, in the estimation of the speaker, has removed from employers the ever-present danger and expense of resorting to common law courts to settle accident cases.

Furmets Meeting

Furmets of the Indiana association, with president C. C. McManama presiding and all officers in attendance excepting John C. Henly, treasurer, who is quite ill, held their business meeting on Wednesday morning. This is the first meeting of the Furmets that Mr. Henly had missed in 35 years. The organization was also informed of the recent death of Glenn Hawthorne, for many years connected with the Hall-Neal Furnace Company.

As a result of the experiment in segregating the convention sessions and displays from hotel headquarters, a committee with Frank Myers of Owens-Illinois Glass Company as chairman was appointed to work up suggestions for future convention programs, these suggestions to be submitted to the contractors' association. The committee appointed to serve under Mr. Myers consists of Grant Wilson, of Grant Wilson, Inc., Bob Gustafson of the Round Oak Company, Al Nemec of Capitol Furnace and Stove Repair Co., Harry Jones of Lamneck Products, Inc., R. P. Wettstein of AMERICAN ARTISAN, and the committee moved as its first piece of business to request all members or contractors or persons with suggestions to sumit their ideas for future convention programs to the committee.

Furmet Officers

President—Frank Mutz, Peerless Foundry Co.
1st V. P.—W. P. Meadow, Tanner & Co.
2nd V. P.—R. C. Gustafson, Round Oak Co.
3rd V. P.—Herman Schmidt—W. J. Holliday Co.
4th V. P.—Russell Thompson, Mt. Vernon Furnace & Mfg. Co.
Secretary—Geo. C. Joslin, Tanner & Co.
Treasurer—John C. Henly, Tanner & Co.

Board of Directors

Chairman—C. C. McManama, Indianapolis Machinery Co.
A. C. Nemec, Capitol Furnace & Stove Repair Co.
R. G. Renick—Indianapolis Machinery Co.
James Cashman, Indianapolis Machinery Co.
Geo. A. Kelly, Meyer Furnace Co.
E. E. Meeks, American Rolling Mill Co.
H. P. Jones, Lamneck Products, Inc.

Publicity Committee

Etta Cohn, Nat'l Sheet Metal Contractor.
J. D. Wilder, American Artisan.
E. C. Carter, Snips.

Membership Committee

F. L. Meyers, Owens-Illinois Glass Co.
H. C. Jones, Tanner & Co.

Sergeant-at-Arms

Herbert Ryan, Grant Wilson, Inc.

5 SUPERIOR FEATURES *in the* RYBOLT CAST IRON FURNACE

. . . and when we say superior features . . . we mean exactly that! The 5 point cast iron RYBOLT is tops in the warm air heating field. Our 26 years of furnace building experience has gone into the making of it . . . 26 years in which we have learned just what the furnace man wants. Check over the following features of the RYBOLT cast iron and prove to yourself that we've made no idle statement.

- **BEAUTY**—It'll fit right in with your customers' decorated basements, where a shoddy heating plant would spoil the arrangement.
- **STRENGTH**—RYBOLTS are put in to stay. The toughest winters can do nothing to harm them and they perform season after season with little or no attention.
- **ECONOMY**—This is probably the point you'll make the sale on. The RYBOLT 5 point cast iron will lick the toughest winters with a minimum of fuel and service. We can prove it!
- **PRICE**—It's priced low. Not cheaply, because a cheap heating plant with its subsequent repairs and costly operation is a waste of hard earned dollars.
- **QUALITY**—You can search the field from top to bottom but nowhere will you find a heating plant that can boast the built in RYBOLT quality. Our reputation speaks for itself through materials and construction.

Drop us a line today for further information on the RYBOLT 5 point cast iron. It'll prove to be well worth the time. A penny postcard will bring the facts.

The Rybolt Heater Company
ASHLAND OHIO

"THE TOOLS YOU NEED TODAY"

25 YEARS EXPERIENCE BUILDING QUALITY PRODUCTS

A
NEW... and Better
NOTCHER

● Every sheet metal shop needs a good Notcher (or several of them) for notching out box corners, curved flanges, etc. HERE IS A NEW ONE with several advanced features (patents applied for). Designed BY practical men FOR practical men. Has full opening in die, and new double-duty depth gauge which does not project beyond nose. Capacity 13/16" deep notch in 20 ga. Weight only 1 lb. Whitney quality construction throughout. See your dealer today!

WHITNEY METAL TOOL CO.

OVER 80 ITEMS FROM WHICH TO CHOOSE

91 FORBES ST., ROCKFORD, ILL.

YOU CAN DOUBLE YOUR BUSINESS THIS WINTER WITH The TORNADO Furnace Cleaner

The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too!

The TORNADO is the most powerful furnace cleaner built. Leads the field! Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Thousands in use. Write now for complete information.

Breuer Electric Mfg. Co.
65 Blackhawk Street, Chicago, Ill.

By the best authorities

HEATING, PIPING *and* AIR CONDITIONING

6 N. Michigan Avenue, Chicago, Ill.

Good, sound, practical information which will help greatly in simplifying your work and which is written by the industry's best authorities. This best describes the contents of every issue of HEATING, PIPING *and* AIR CONDITIONING.

To be thoroughly informed subscribe today. Two Dollars a year.

With the Manufacturers . .

Hall-Neal Representative Passes

Glen E. Hawthorne, Indiana representative of the Hall-Neal Furnace Co., Indianapolis, Indiana, died on January 13, following a few days of illness from pneumonia.

◆

Landau Manages Heating Division

The A. B. C. Oil Burner & Engineering Co., Inc., 2012 Chestnut Street, Philadelphia, announces the appointment of Mitchel Landau as manager of the heating division.

C. W. Whitney is president.

◆

Mercoid Opens Philadelphia Office

The Mercoid Corporation, Chicago manufacturers of control equipment, announce the opening of a branch office and warehouse at 3137 N. Broad Street, Philadelphia. John Jex, Jr., will be in charge of the office and will be assisted by W. K. Stauffer. The company announces that a complete stock of control apparatus will be maintained in the new warehouse.

◆

Autovent Changes

The Autovent Fan and Blower Co. of Chicago announces that Tom Brown has been promoted to the position of vice president and general manager. George J. Kalwitz, has been promoted from sales engineer to general sales manager. Robert F. Ruggles, formerly manager of the New York office of Autovent has been advanced to the position of Eastern division manager. Several new representatives and dealers have recently been appointed.

◆

Trailer Tractor Caravan of Oil Burners

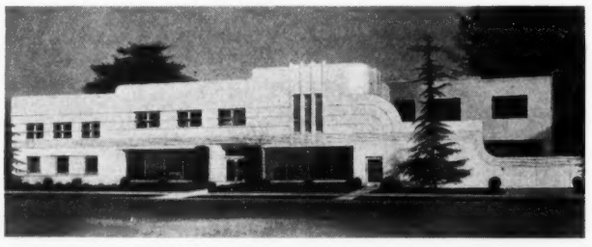
A caravan of tractor trailer trucks arrived in Boston in December from Electrol, Incorporated, Clifton, N. J., loaded with Electrol oil burners. The fleet consisted of five 30-foot tractor-trailers loaded to full capacity, and the shipment was made to Buckley & Scott Utilities Corporation, 570 Commonwealth Avenue, Boston and Providence, who immediately inaugurated an extensive newspaper advertising campaign in line with the ever-increasing popularity of oil heating and air conditioning.

◆

Modernizes Factory

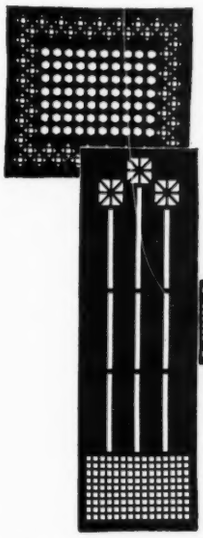
Payne Furnace & Supply Company, 336 North Foothill Road, Beverly Hills, California, opened their new ultra-modern plant for public inspection late in November, 1936.

The plant is complete in detail and better manufacturing facilities make for speedier production and efficiency, as well as improved working conditions for employees.

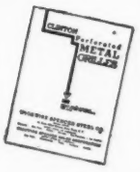


There is a beautiful display room on the first floor of the main building for architects, dealers and salesmen. Some of the furnaces and appliances are installed as operating displays and each is given a natural setting. A winter air conditioner installed is designed for an operating display and at the same time is used for actually conditioning the air within the building.

Much new and modern equipment has been placed throughout the plant. Also included is a laboratory completely equipped for rigidly testing all products before they are finally submitted to the Laboratory of the American Gas Association for tests and approval.



CLINTON
PERFORATED METAL
GRILLES
in
Combination Designs



Send for the new folder CLINTON PERFORATED METAL GRILLES. It will be of interest and value to you.

The thousands of Wissco Stock Dies are only the media of expressing original ideas in perforated metal designs. By indicating the arrangement of stock units you have available endless possibilites of unique patterns at nominal prices.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City
Worcester Buffalo Chicago San Francisco

WICKWIRE SPENCER perforated metals

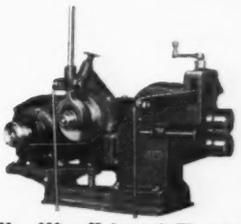
MONEY MAKERS
with a 118 year record of RESULTS

PEXTO

MACHINES and TOOLS
for
SHEET METAL WORKING

"Good for over 100 years . . . even better today."

Remember, PEXTO makes a COMPLETE Line of Machines and Tools for the fabrication of sheet metal products. Every unit is a Production-proved money-maker for equipment or modernization of your shop. Write us your requirements.



No. 623 — Universal Electric Rotary Machine.

No. 63 — Adjustable Bar Folder with counter balance.

No. 622 — Deep Throat Combination Machine.

THE PECK, STOW & WILCOX CO.
Established 1819
SOUTHINGTON, CONNECTICUT

FURNACE REPAIRS

made with

A PRODUCT OF THE NATIONAL FOUNDRY & FURNACE CO. — TRADE MARK — CHRONAT IRON — RESISTS WEAR AND FIRE

Fit Right — Last Longer

THE NATIONAL FOUNDRY & FURNACE CO.
1144 Bolander Ave. DAYTON, OHIO

DRIES FASTER
SETS STRONGER
LASTS LONGER

From every angle outstanding advantages are apparent in **LACLEDE FURNACE CEMENT.** For a tighter joint and one that **stays** tight — insist on Laclede brand, Generous FREE sample on request.

FOR EVERY COMBUSTION CHAMBER

—Oil, coal or gas fired—there is a Laclede high temperature specialty that will do it better. Write for full information.

LACLEDE-CHRISTY CLAY PRODUCTS CO.
ESTABLISHED SINCE 1844
411 N. SEVENTH ST. • ST. LOUIS, MO.

WARD
SHEET METAL WORKING
MACHINERY
If it is a machine, tool or supply for the Sheet Metal Shop—We have it!
TRY WARD IN 1937
Your inquiries earnestly solicited.
564 W. Washington Blvd. Chicago, Ill.

JUST SO
YOU'LL REMEMBER
We made the can as big as our economical little ad will allow. The little ad is typical of Burnley's paste—a little goes a long way. Your nearest Jobber carries Burnley Fluxes—"if he knows his fluxes." Write for sample today.
Burnley Battery & Mfg. Co • North East, Pa.
Soldering Paste. Salts. Solution. Stick

A GRAND RAPIDS FURNACE CLEANER
will start your Spring business.
Our manual, "A Plan To Increase Your Sales" goes with the machine. It outlines every detail in building your business through furnace cleaning. This is not an armchair theory but the outcome of successful experience. It will work with your business set-up. Refined and Improved.
FREE TRIAL—CONVENIENT TERMS
Unbelievably Low Priced.
Write for details
Grand Rapids Furnace Cleaner Co.
Grand Rapids, Michigan

ACME "Hot Spot" WELDERS
Universally accepted as the sturdiest, easiest handled, most economical electric Spot Welder on the market.
Write for literature and prices
Don't Rivet
SPOTWELD!
with an ACME
Lifetime Guarantee!
Complete range of sizes

ACME ELECTRIC WELDER CO.
Warehouses in principal cities
5619 Pacific Blvd. Huntington Park, Calif. (Los Angeles County)

With The Manufacturers . .

Dail to Build New Office Building

Dail Steel Products Company, Lansing, Michigan, has contracted for a new office building in order to provide much needed space for the rapidly increasing business of the company.

◆

Furblo Classes

Furblo Company, Hermansville, Michigan, organized a class in air conditioning on January 15 at the Architects and Builders Building in Indianapolis, Indiana, with about 125 in attendance. Guy Voohees is the instructor, and the Indianapolis Machinery & Supply Company and Tanner & Company are sponsoring the classes. The attendance was so great that two classes will have to be formed to take care of all who want this instruction.

The Furblo Company is also planning classes for Fort Wayne, Indiana.

◆

Following in Father's Footsteps

Here is a group of 28 fathers and their 29 sons, taken from the 360 employees of J. Wiss & Sons Company, of Newark, N. J., each son standing immediately behind his father. In these days of industrial unrest it is quite refreshing to come across a record of father and son employment such as is shown in the accompanying picture.

The Wiss Company, established in 1848, has men still in active daily service who worked under the founder, Jacob Wiss, in the old plant on the present site of the Prudential Insurance Company, nearly 60 years ago. A few are Albert Lehman, who started in 1876; Gottlieb Ott, 1879; Jack Bohle, 1880, and Paul Lee, 1881.

Executives of the company encourage the hiring of sons of their employees.

◆

Fox Air Conditioning Schools

On February 8, The Fox Furnace Company, Elyria, Ohio, initiated, in Chicago, its fourth consecutive year of Air Conditioning Engineering Schools for its distributing organization. Classes were in session for five days instead of three as in the past.

Instruction in the engineering of residential air conditioning, based on the latest developments in the field, were conducted by The Fox Furnace personnel. Lectures and demonstrations on controls, blowers, motors and similar equipment were given by recognized experts.

In addition to the Chicago School, February 8 to 12, other schools will be conducted in Atlanta, Ga., March 1 to 5 and in New York City, March 15 to 19.

Following these schools, Sunbeam jobbers will stage local schools for their dealers.

"The value of engineering schools to our organization and to the industry has been proven by our experience of the last four years," says C. A. Olsen, president of The Fox Furnace Company. "The future of air conditioning depends, to a large extent, on the recommendation of satisfied users of air conditioning systems; the best method of insuring the user's satisfaction is by applying recognized engineering principles to every installation."

PORTABLE SHEARS
ALL-ALLOY

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

FULLY GUARANTEED

BREMIL MFG. CO. Erie, Pa.

RYERSON
IMMEDIATE SHIPMENT FROM STOCK

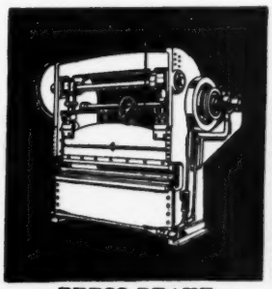
More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.
Write for Stock List

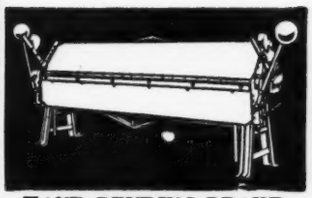
JOSEPH T. RYERSON & SON INC

CHICAGO DETROIT MILWAUKEE ST. LOUIS JERSEY CITY CINCINNATI BUFFALO CLEVELAND PHILADELPHIA BOSTON

SHEETS

CHICAGO

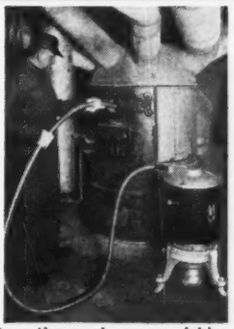




PRESS BRAKE **HAND BENDING BRAKE**

Steel Brakes—Presses—Shears

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. **CHICAGO**



DOUBLE YOUR BUSINESS
with a
KENT
Furnace Vacuum CLEANER

Does the work more quickly and efficiently and puts you in touch with prospects for repairs and new work. With a KENT you can double your business.

Double Suction — Twice the Power — One-Man Unit

THE KENT CO., INC., 167 Canal Street ROME, N. Y.

for BOILER FURNACE AND STOVE REPAIR PARTS
A.G. BRAUER SUPPLY CO.
316 N. THIRD ST.
ST. LOUIS, MO.

IRONSET
the Furnace *and* Retort Cement
THAT IS
GUARANTEED
Not to crack, bloat, shrink or blister

A Fireline Product—
Write for Circular

Fireline Stove & Furnace Lining Co., 1866-B, Kingsbury St., Chicago

Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?
—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

AMERICAN ARTISAN
6 North Michigan Ave. **Chicago, Ill.**

Victor heating equipment is a line that enables you to buy all your requirements from one reliable source.

This Victor demonstrator enables Victor dealers to close sales at a profit. Investigate this money making line. Write or wire.

HALL-NEAL FURNACE CO., Indianapolis, Ind.

THE HOTEL of THE MONTH
Chittenden Hotel
COLUMBUS OHIO

ALBERT
PICK
HOTELS

You'll get more for your money at Pick Hotels. Spacious, comfortable rooms. Delicious food and real personal service. All at moderate prices.

CHICAGO, ILL. ..... GREAT NORTHERN HOTEL
DETROIT, MICHIGAN ..... TULLER HOTEL
DAYTON, OHIO ..... MIAMI HOTEL
COLUMBUS, OHIO ..... CHITTENDEN HOTEL
COLUMBUS, OHIO ..... FORT HAYES HOTEL
TOLEDO, OHIO ..... FORT MEIGS HOTEL
CINCINNATI, OHIO .. FOUNTAIN SQUARE HOTEL
CANTON, OHIO ..... BELDEN HOTEL
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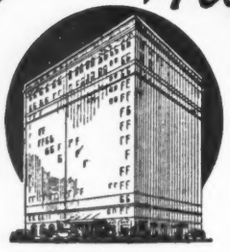
ANDERSON, INDIANA ..... ANDERSON HOTEL
TERRE HAUTE, INDIANA . TERRE HAUTE HOUSE
ASHLAND, KENTUCKY ..... VENTURA HOTEL
OWENSBORO, KENTUCKY . OWENSBORO HOTEL
JACKSON, TENNESSEE . NEW SOUTHERN HOTEL
ST. LOUIS, MO. ..... MARK TWAIN HOTEL
WACO, TEXAS ..... RALEIGH HOTEL

THE WORD PICK SHOULD ALWAYS REMIND YOU OF ALBERT PICK HOTELS

Magnetic
in St. LOUIS



The pull of solid comfort and real luxury draws the travel-wise to Hotel Melbourne in St Louis. Just a few minutes from all points of interest Dining Room and Coffee Shop serving splendid food at low prices.

400 ROOMS
FROM $2.50 WITH BATH
J. K. BRYAN
Manager

HOTEL
MELBOURNE
LINDELL BOULEVARD AT GRAND AVENUE

News Items . . . . . .

New Portland Sheet Metal Shop

Charles C. Dickinson has engaged in the sheet metal business at 2211 N. E. Union, Portland, Ore.

◆

Harry Beaman Joins Central Supply

Harry Beaman, who has been active in heating and residential air conditioning in Indiana for several years, has joined the Central Supply Company of Indianapolis, and will be in charge of residential heating work in the Indianapolis area.

◆

Peter A. Lorenz Dies

Peter A. Lorenz, vice president of the Chicago Furnace Supply Co., 1278 Clybourn Avenue, died at his home in Chicago the first week in January. Mr. Lorenz was a resident of Chicago during most of his life and for the past thirty years had been actively associated with the Chicago Furnace Supply Company. Mr. Lorenz's acquaintanceship among Chicago area contractors was extensive and his passing will be regretted by the entire industry in the Chicago area.

◆

Fred S. Sherrod Passes

Fred S. Sherrod, who for a number of years has operated a sheet metal shop in Covington, Tennessee, died at Ripley, Tennessee, on November 24 from a heart attack. Mr. Sherrod and Frank Elcan had started putting on a tin roof at the store of G. L. Rice, when Mr. Sherrod was stricken. He was taken to a physician's office and died in twenty minutes. He was a son of the late Dr. John I. Sherrod and was born and reared in Covington. He is survived by his wife and seven children. He was a member of the Episcopal Church.

◆

Oil Burner Show

The Fourteenth National Oil Burner and Air Conditioning Exposition is to be held at Philadelphia March 15-19. Two months prior to the opening date, G. Harvey Porter, Managing Director of the Oil Burner Institute and of the show, reported that 70 per cent of the available floor space at Convention Hall had been taken. Full lines of the newest oil burner, distillate burners, air conditioning and heating equipment and accessories, will be exhibited.

Among the organized groups lending official support to the program are the Air Conditioning Manufacturers Association, The Electrical Association of Philadelphia of which the Oil Burner group is a part, and the American Petroleum Industries Committee led by General B. H. Markham, director. A Joint Committee on Cooperation led by J. J. Donovan will function in the interest of the Air Conditioning and Oil Burner industries.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.,
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
101	102	103	104	105	106	107
108						

Name..... Title.....

Company .....

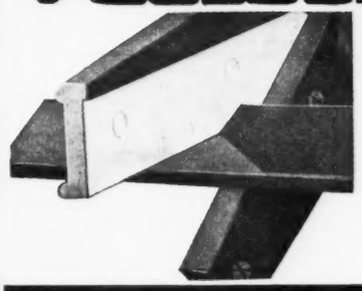
Address .....

Are you Manufacturer——Jobber——Dealer——

KEEP OLD MAN WINTER ON THE RUN

XX^TH CENTURY HEATING & VENTILATING CO.
AKRON, OHIO

Viking SHEARS



Every pound of pressure on the handles of a Viking Shear is multiplied 20 times at the cutting edge. A Viking weighs 22 lbs., is sturdily built and the specially tempered blade has a long life. Select a Viking for a life time of clean cuts.

VIKING SHEAR CO. ERIE, PA.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS WANTED

AIR CONDITIONING engineer wants permanent connection with reliable Manufacturer or Dealer. Experienced on residential and public buildings. Will go anywhere. Write FRANK CLARK, 1024 East Ogden Avenue, Milwaukee, Wisconsin.

MISCELLANEOUS

Patents and Trade Marks

Philip V. W. Peck

Barrister Bldg., Washington, D.C.

RIBBED WIRE GLASS-15c per SQ. FT.
STOCK SHEETS, CASE LOTS, PLUS BOXING F. O. B. BUFFALO, N. Y. SHIPMENT TO ANY PART OF THE UNITED STATES
QUOTATIONS ON ALL KINDS OF GLASS ON REQUEST
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Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with asterisk.

February, 1937

Acme Electric Welder Co..... 98
Acme Heating & Ventilating Co. 71
Aerofin Corp. 73
American Air Filter Co., Inc... 37
American Brass Co.....
.....Outside Back Cover
American Rolling Mill Co., The 13
Auer Register Co..... 87
Autocrat Oil Burner Corp..... 79
Automatic Humidifier Co..... 72
Automatic Products Co..... 75

Barber-Colman Co. 75
Barber Gas Burner Co., The... 75
Bead Chain Mfg. Co..... *
Benson Co., Inc., Alex R..... *
Berger Bros. Co.....102
Berger Mfg. Co., Div. of Republic Steel Corp. Inside Front Cover
Bethlehem Steel Co..... *
Brauer Supply Co., A. G..... 99
Bremil Mfg. Co..... 99
Breuer Electric Mfg. Co..... 96
Buffalo Forge Co.....
.....Inside Back Cover
Burnley Battery Co..... 98

Canton Steel Ceiling Co..... *
Capitol Furnace & Stove Repair Co. ..... *
Central Furnace & Stove Repair Co. ..... *
Century Electric Co..... 41
Century Engineering Corp..... 42
Chicago Steel Furnace Co..... 79
Christie Cleaner Co..... 94
Clarage Fan Co..... 78
Congress Tool & Die Co..... 78
Cook Electric Co..... 65

Dail Steel Products Co..... *
De Bothezat Div., American Machine and Metals Mfg. Corp. 76
Delco Products Corp..... 81
Detroit Lubricator Co..... 38
Dreis & Krump Mfg. Co..... 99

Econocol Stoker Co..... 79
Electric Vacuum Clnr. Co., Inc.. *
Elgo Shutter & Mfg. Co..... 80
Emerson Electric Co..... *

Favorite Stove Co., The..... *
Fireline Stove & Furnace Lining Co. .....93 and 99
Fitzgibbons Boiler Co., Inc.... 75
Forest City Foundries Co., The *
Fox Furnace Co., The..... 9
Friez & Sons, Julien P..... *
Furblo Co. 39

G & O Mfg. Co..... *
General Electric Co..... 46
Gleason-Avery, Inc. 80
Grand Rapids Furnace Cleaner Co. 98
Griswold Mfg. Co..... *

Hall-Neal Furnace Co..... 99
Harrington & King Perf. Co... 94
Hart & Cooley Mfg. Co..... 6
Henry Furnace & Foundry Co., The 12
Hess-Snyder Co. 90
Hess Warming & Ventilating Co. 70
"Home Comfort" Furnace & Mfg. Co. ..... *
Hotel Melbourne 100
Hussey & Co., C. G..... *

Illinois Testing Lab., Inc..... 79
Independent Register Co., The 8
International Nickel Co., Inc... 5
Interstate Machinery Co.....101

Johnson Co., S. T..... 74
Joliet Heating Corp..... *

Kent Co., Inc..... 99

Laclede-Christy Clay Products Co. 97
Lamneck Products, Inc..... *
Lau Blower Co..... 68
Libert Machine Co..... *
Lincoln Electric Co..... 11
Lochinvar Corp. ..... *
Lyon-Conklin & Co..... 96

Maid-O'-Mist, Inc. ..... *
Maplewood Machinery Co.....101
Marshalltown Mfg. Co..... 87
Maurey Mfg. Corp..... 80
Mercoid Corp., The..... 72
Meyer & Bro. Co., F..... *
Meyer Furnace Co..... *
Milcor Steel Co..... *
Minneapolis-Honeywell Regulator Co. 43
Monmouth Products Co..... 69
Morency-Van Buren Div., Scovill Mfg. Co..... 71
Mueller Furnace Co..... 14

National Fan & Blower Corp... *
National Fdry. and Furnace Co. 97
Nelson Corp., Herman..44 and 45
Niagara Machine & Tool Works 89
Norge Heating & Conditioning Div., Borg-Warner Corp..... 40
Northwestern Stove Repair Co. *
Nu-Way Corp., The..... 82

Ohio Electric Mfg. Co..... 77
Ohio Products Co..... *
Oil Burner Builders, Inc..... 76
Osborn Co., J. M. & L. A..... 17
Owens-Illinois Glass Co..... *

Pacific Gas Radiator Co..... 64
Parker-Kalon Corp. 10
Payne Furnace & Supply Co... 16
Peck, Stow & Wilcox Co..... 97
Peerless Electric Co..... 77
Peerless Foundry Co..... *
Peninsular Stove Co..... *
Penn Electric Switch Co..... *
Perfex Controls Co..... 69
Pick Hotels, Albert.....100
Practical Instrument Co..... 80
Premier Division, Electric Vacuum Cleaner Co., Inc..... *
Premier Furnace Co..... *
Pyrolite Products Co..... 89

Randall Graphite Products Corp. 77
Republic Steel Corp..... 18
Revere Copper & Brass, Inc.... 15
Rock Island Register Co..... *
Ruby Chemical Co..... *
Rudy Furnace Co..... 63
Russell Electric Co..... 3
Rybolt Heater Co., The..... 95
Ryerson & Son, Inc., Joseph T. 9

St. Louis Technical Institute...101
Schaefer Brush Mfg. Co..... *
Schwitzer-Cummins Co. ..... *
Scott-Newcomb, Inc. 73
Scovill Mfg. Co..... 71
Skilsaw, Inc. 65
Skuttle Co., J. L..... 77
Stanley Electric Tool Div., Stanley Works, Inc..... 91
Superior Sheet Metal Co..... *
Supreme Electric Products Corp. ..... *
Surface Combustion Corp..... 67
Swartwout Co., The..... 93

Torrington Mfg. Co..... *
Trane Co., The..... *
Tuttle & Bailey, Inc..... 67
Twentieth Century Heating & Ventilating Co. 101

U. S. Air Conditioning Corp... 66
United States Register Co..... *
Universal Blower Co..... *

Victor Electric Co..... *
Viking Shear Co.....101
Vulcan Arc Welder Mfg. Co.... 90

Wagner Electric Co..... *
Ward Machinery Co..... 98
Waterloo Register Co., The.... 36
White Mfg. Co..... 74
Whitney Mfg. Co., W. A..... 93
Whitney Metal Tool Co..... 96
Wickwire Spencer Steel Co.... 97
Wise Furnace Co., The..... *

XXth Century Heating & Ventilating Co. 101

Youngstown Sheet & Tube Co.. 7

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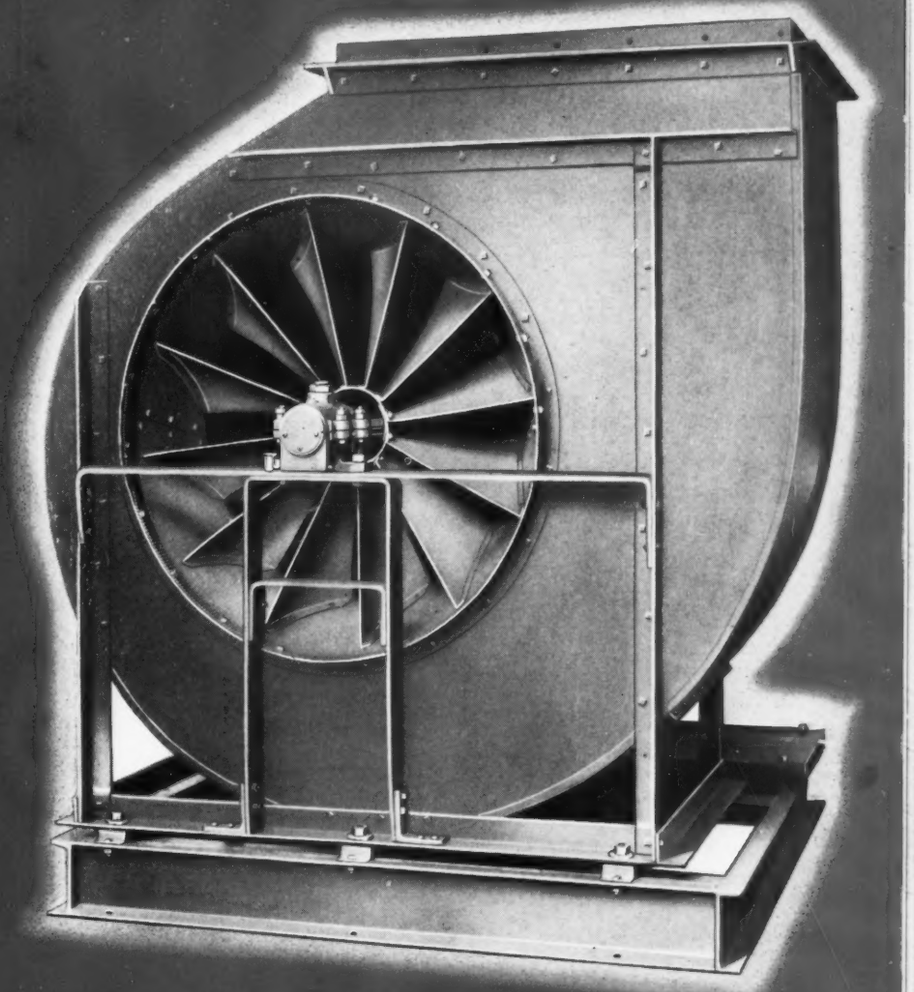
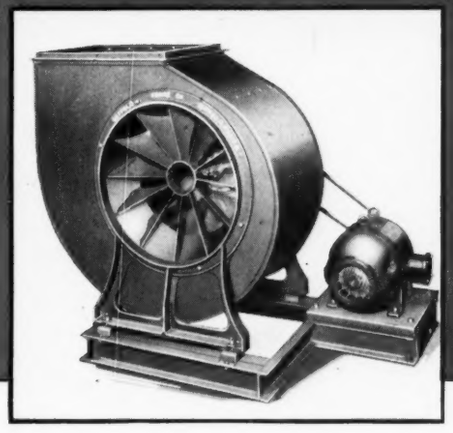


Buffalo "Limit-Load" Fan mounted on Buffalo Silent Floating Base, a practical inexpensive arrangement which guarantees the insulation of fan and motor from building foundations.



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